



# Numbers '08

## User's Guide

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Apple  
1 Infinite Loop  
Cupertino, CA 95014-2084  
408-996-1010  
[www.apple.com](http://www.apple.com)

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019-1277 06/2008

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# Welcome to the *Numbers User's Guide*

This full-color PDF document provides extensive instructions for using Numbers.

Before using this document, you may want to look at the Numbers tutorial in *iWork '08 Getting Started*. It's a quick way to prepare yourself to be a self-sufficient Numbers user. *iWork '08 Getting Started* also provides additional resources for getting acquainted with Numbers, such as a tour of its features and how-to videos.

When you need detailed instructions to help you accomplish specific tasks, you'll find them in this user's guide. Most of the tasks in this guide are also available in online help.

The following table tells you where to find information in this guide. In Numbers Help, you can find information by browsing or searching.

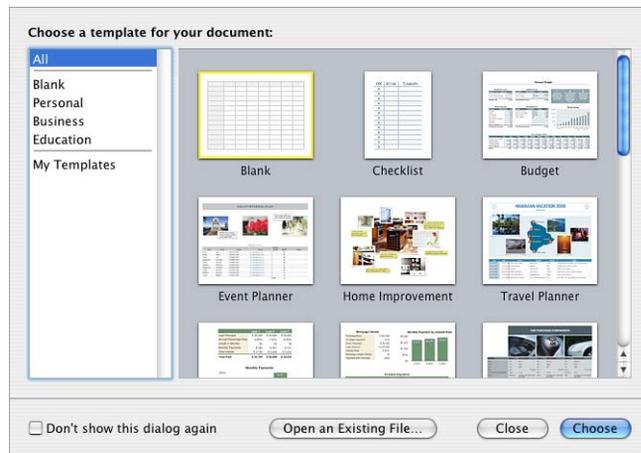
For information about	See
Using Numbers windows and tools to create and format spreadsheets	Chapter 1, "Numbers Tools and Techniques," on page 18
Creating and saving Numbers spreadsheets, and managing sheets and pages	Chapter 2, "Working with a Numbers Spreadsheet," on page 31
Creating, organizing, and formatting tables and values in them	Chapter 3, "Using Tables," on page 44
Using table styles to change the appearance of tables	Chapter 4, "Working with Table Styles," on page 79
Using formulas and functions for calculations in table cells	Chapter 5, "Using Formulas and Functions in Tables," on page 83
Creating charts to graphically display numeric data in one or more tables	Chapter 6, "Using Charts," on page 98
Formatting text in a Numbers spreadsheet	Chapter 7, "Working with Text," on page 119
Using graphics, shapes, sound, and more to enhance a spreadsheet	Chapter 8, "Working with Shapes, Graphics, and Other Objects," on page 149
Displaying Address Book data in tables	Chapter 9, "Adding Address Book Data to a Table," on page 179
Printing and exporting spreadsheets and sending them to iWeb	Chapter 10, "Sharing Your Numbers Spreadsheet," on page 183
Creating custom Numbers templates	Chapter 11, "Designing Your Own Numbers Spreadsheet Templates," on page 188
Using individual functions in table cells	Chapter 12, "Dictionary of Functions," on page 193

This chapter introduces you to the windows and tools you use to work with Numbers spreadsheets.

When you create a Numbers spreadsheet, you first select a template to start from.

## Spreadsheet Templates

When you first open the Numbers application (by clicking its icon in the Dock or double-clicking its icon in the Finder), the Template Chooser window presents a variety of spreadsheet types from which to choose.



Pick the template that best fits your purpose. If you want to start from a plain spreadsheet, without preformatting, pick the Blank template. After selecting a template, click Choose to work with a new spreadsheet based on the selected template.

Templates contain predefined sheets, tables, and other elements that help you get started.

Sheets let you divide information into groups of related objects. You might use one sheet for data from 2006 and another sheet for data from 2007.

Predefined tables usually contain text, formulas, and sample data. You can replace data in the predefined tables with your own data, and you can add columns and rows or reformat the tables. You can also add sheets and other objects, such as charts, images, and text.

*Guest List*

Last	First	Phone	Email	Total in party	RSVP	Notes
Smith	John	(123)456-7890	no_reply@apple.com	3	<input checked="" type="checkbox"/>	
Jones	Jenny	(123)456-7890	no_reply@apple.com	4	<input checked="" type="checkbox"/>	
Faith	Jan	(123)456-7890	no_reply@apple.com	2	<input checked="" type="checkbox"/>	
Applewood	Christine	(123)456-7890	no_reply@apple.com	3	<input checked="" type="checkbox"/>	
				<b>Total</b>		<b>12</b>

Drag and drop cards from Address Book.

Explanatory comments are included in some of the templates.

# The Numbers Window

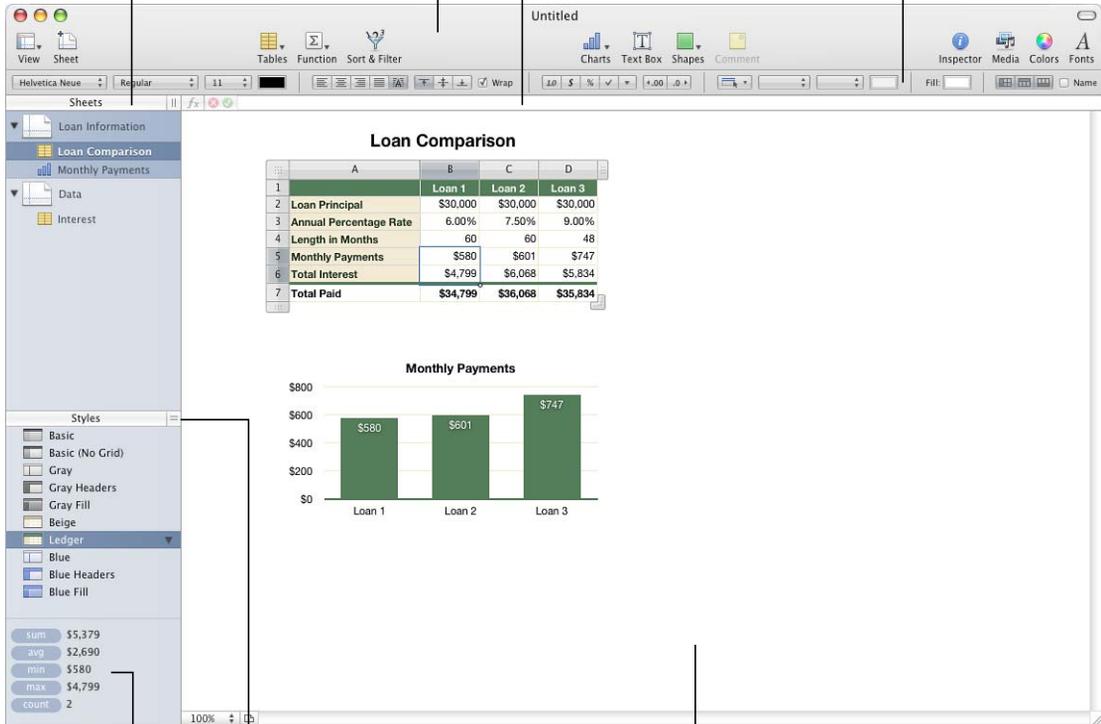
The Numbers window has elements that help you develop and organize your spreadsheet.

**The Sheets pane:**  
See an overview of the tables and charts on the sheets of your spreadsheet.

**The toolbar:**  
Customize it to include the tools you use most often.

**The Formula Bar:**  
Create and edit formulas in table cells.

**The Format Bar:**  
Quickly format the selected object.



View the results of calculations for values in selected cells, and drag calculations into

**The Styles pane:**  
Select a predefined table style to quickly format a table.

**The sheet canvas:**  
Create and edit tables, charts, and other objects on a sheet.

- Quickly add a new sheet by clicking the Sheet button in the toolbar. After you add tables, charts, and other objects to a sheet, including imported graphics, movies, and sound, you can drag objects around on the Numbers canvas to rearrange them.
- Use the Sheets pane to see a list of the tables and charts on any sheet.
- Apply predefined table styles listed in the Styles pane to change the appearance of a selected table.
- Use the area in the lower left to perform instant calculations on values in selected table cells.

- Use buttons in the toolbar to quickly add tables, charts, text boxes, media files, and other objects.

For example, click the Tables button in the toolbar to add a new table that's been preformatted for the template you're using. All templates contain several preformatted tables for you to choose from.

See "The Toolbar" on page 24 to learn how to customize the toolbar so it includes the tools you use most often.

- Use the Format Bar to quickly format a selected object.
- Use the Formula Bar to add and edit formulas in table cells.

## Spreadsheet Viewing Aids

As you work on your spreadsheet, you may want to zoom in or out to get a better view of what you are doing, or use other techniques for viewing the spreadsheet.

### Zooming In or Out

You can enlarge (zoom in) or reduce (zoom out) your view of a sheet.

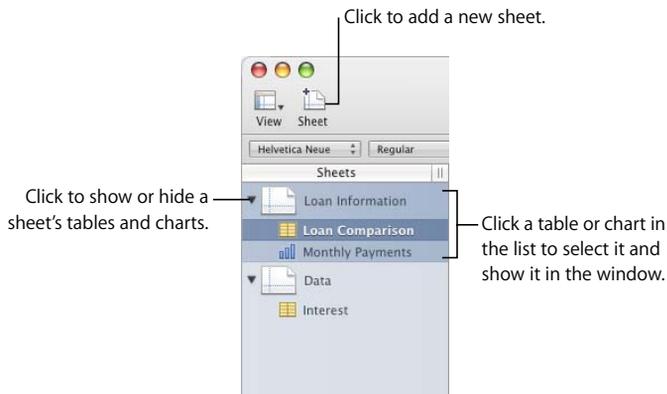
**Here are ways to zoom in or out of a sheet:**

- Choose View > Zoom > *zoom level*.
- Choose a magnification level from the pop-up menu at the bottom left of the canvas.

When you view a sheet in Print View, decrease the zoom level to view more pages in the window at one time.

### The Sheets Pane

The Sheets pane is located along the top left side of the Numbers canvas. It lets you quickly view and navigate to tables and charts in a sheet.



See "Using Sheets to Organize a Spreadsheet" on page 37 for more information.

## Print View

When you want to print a sheet or make a PDF of it, you can use Print View to visualize the layout of objects on a sheet on individual pages.

The screenshot shows a spreadsheet in Print View, divided into four quadrants. The top-left quadrant contains a table titled "COST SUMMARY". The top-right quadrant contains a 3D rendering of a living room. The bottom-left quadrant contains a pie chart titled "Cost Overview". The bottom-right quadrant is empty. The spreadsheet has a grid with columns numbered 0 to 18 and rows numbered 0 to 12. Annotations with arrows point to various UI elements:

- "Click to view pages in landscape (horizontal) orientation." points to the landscape orientation icon.
- "Click to view pages in portrait (vertical) orientation." points to the portrait orientation icon.
- "Click to choose a page zoom level that lets you see more or fewer pages." points to the zoom level dropdown menu.
- "Click to show or hide Print View." points to the print view toggle icon.
- "Slide to shrink or enlarge all the sheet's objects." points to the content scale slider.

Task	Total Cost	Notes
Appliances	\$3,200.00	
Cabinets	\$4,500.00	
Cabinet Hardware	\$250.00	
Electrical	\$2,000.00	
Plumber	\$1,250.00	
Furniture	\$1,200.00	
Floor	\$3,200.00	
Lighting	\$475.00	
Paint	\$600.00	
<b>Total</b>	<b>\$22,075.00</b>	

Category	Percentage
Appliances	30%
Cabinets	20%
Cabinet Hardware	1%
Electrical	12%
Plumber	6%
Furniture	5%
Floor	14%
Lighting	2%
Paint	1%

See "Dividing a Sheet into Pages" on page 39 to learn more about Print View.

## Alignment Guides

As you move objects around in a spreadsheet, alignment guides automatically appear to help you position them on the page. See "Using Alignment Guides" on page 152 for details about using alignment guides.

## The Styles Pane

The styles pane lets you quickly apply predefined formatting to tables in a spreadsheet. Table styles define such attributes as color, text size, and cell border formatting of table cells.

To apply a table style, simply select the table and click a style in the Styles pane.



The screenshot shows the Styles pane on the left with "Blue Fill" selected. The table on the right, titled "COST SUMMARY", has a blue fill style applied to its header and data rows.

COST SUMMARY		
Costs		
Task	Total Cost	Notes
Appliances	\$7,952.00	
Cabinets	\$4,500.00	
Cabinet Hardware	\$250.00	
Electrician	\$2,600.00	
Plumber	\$1,250.00	
Furniture	\$1,200.00	
Floor	\$3,200.00	
Lighting	\$475.00	
Paint	\$650.00	
<b>Total</b>	<b>\$22,077.00</b>	

Switching from one table style to another takes only one click.



The screenshot shows the Styles pane on the left with "Beige" selected. The table on the right, titled "COST SUMMARY", has a beige fill style applied to its header and data rows.

COST SUMMARY		
Costs		
Task	Total Cost	Notes
Appliances	\$7,952.00	
Cabinets	\$4,500.00	
Cabinet Hardware	\$250.00	
Electrician	\$2,600.00	
Plumber	\$1,250.00	
Furniture	\$1,200.00	
Floor	\$3,200.00	
Lighting	\$475.00	
Paint	\$650.00	
<b>Total</b>	<b>\$22,077.00</b>	

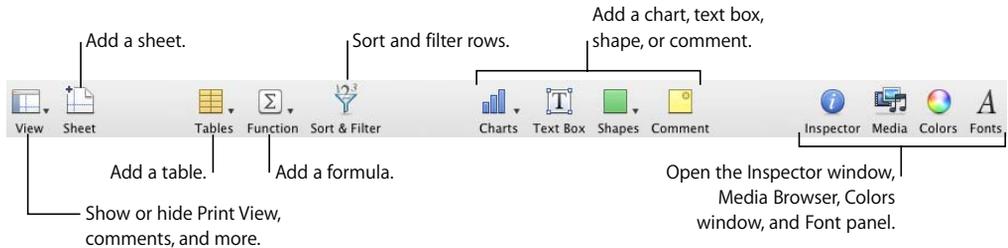
See "Using Table Styles" on page 79 for details.

## The Toolbar

The Numbers toolbar gives you one-click access to many of the actions you perform as you work in Numbers. As you discover which actions you perform most often, you can add, remove, and rearrange toolbar buttons to suit your working style.

To see a description of what a button does, hold your pointer over it.

The default set of toolbar buttons is shown below.



### To customize the toolbar:

- 1 Choose View > Customize Toolbar. The Customize Toolbar sheet appears.
- 2 Make changes to the toolbar as desired.

To *add an item* to the toolbar, drag its icon to the toolbar at the top. If you frequently reconfigure the toolbar, you can add the Customize button to it.

To *remove an item* from the toolbar, drag it out of the toolbar.

To *restore the default* set of toolbar buttons, drag the default set to the toolbar.

To make the toolbar *icons smaller*, select Use Small Size.

To display *only icons or only text*, choose an option from the Show pop-up menu.

To *rearrange items* in the toolbar, drag them.

- 3 Click Done when you've finished.

You can perform several toolbar customization activities without using the Customize Toolbar sheet:

- To *remove an item from the toolbar*, press the Command key while dragging the item out of the toolbar.  
You can also press the Control key while you click the item, and then choose Remove Item from the shortcut menu.
- To *move an item*, press the Command key while dragging the item around in the toolbar.

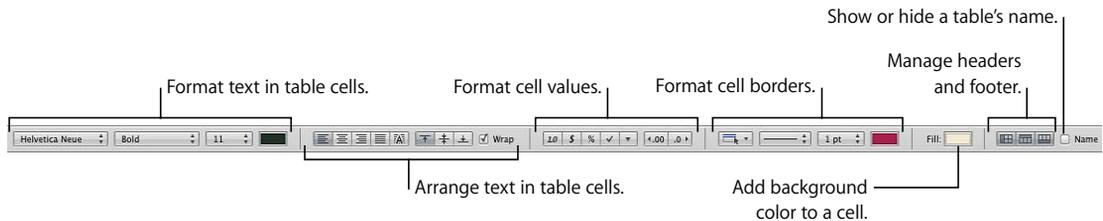
To show and hide the toolbar, choose View > Show Toolbar or View > Hide Toolbar.

## The Format Bar

Use the Format Bar, displayed beneath the toolbar, to quickly change the appearance of tables, charts, text, and other elements in your spreadsheet.

The controls in the Format Bar vary with the object selected. To see a description of what a Format Bar control does, hold the pointer over it.

Here's what the Format Bar looks like when a table or table cell is selected.

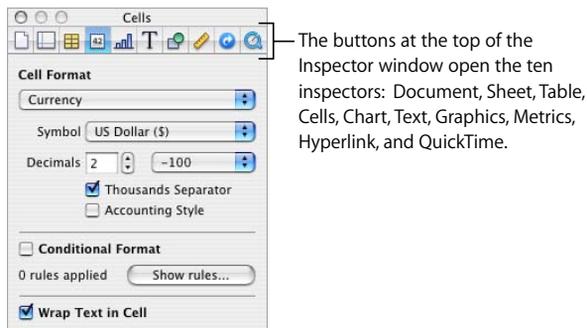


**To show and hide the format bar:**

- Choose View > Show Format Bar or View > Hide Format Bar.

## The Inspector Window

Most elements of your spreadsheet can be formatted using the Numbers inspectors. Each inspector focuses on a different aspect of formatting. For example, the Cells Inspector lets you format cells and cell values. Hold your pointer over buttons and other controls in the Inspector panes to see a description of what the controls do.



Opening multiple Inspector windows can make it easier to work on your spreadsheet. For example, if you open both the Graphic Inspector and the Cells Inspector, you'll have access to all the image- and cell-formatting options.

**Here are ways to open an Inspector window:**

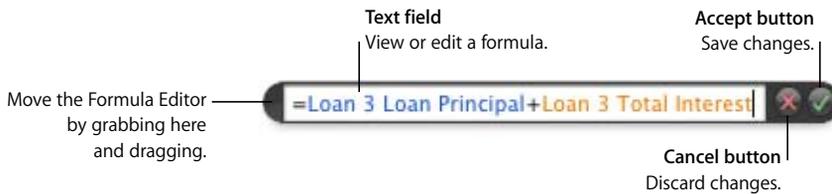
- Click Inspector in the toolbar.
- Choose View > Show Inspector.
- To open another Inspector window, press the Option key while clicking an Inspector button.

After an Inspector window is open, click one of the buttons at the top to display a different inspector. Clicking the second button from the left, for example, displays the Sheet Inspector.

## Formula Tools

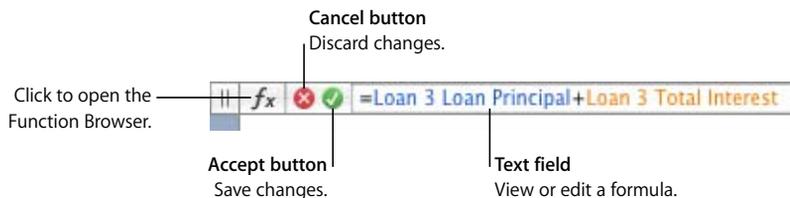
You add a formula to a table cell when you want to display a value in the cell that's derived using a calculation. Numbers has several tools for working with formulas in table cells:

- The *Formula Editor* lets you create and modify formulas. Open the Formula Editor by selecting a table cell and typing the equal sign (=). You can also open it by choosing Formula Editor from the Function pop-up menu in the toolbar.



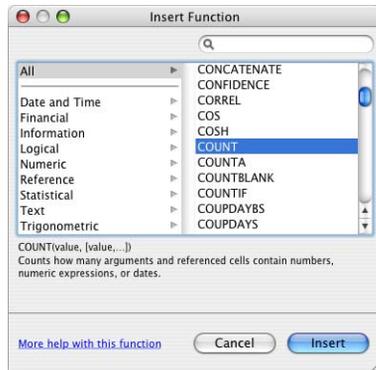
Learn more about this editor in “Using the Formula Editor” on page 88.

- The *Formula Bar*, always visible beneath the Format Bar, can also be used to create and modify formulas.

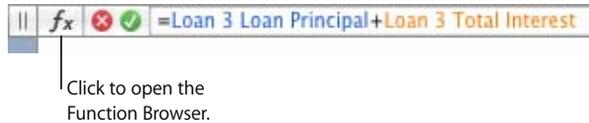


Instructions for adding and editing formulas using this tool are in “Using the Formula Bar” on page 90.

- Using the *Function Browser* is the fastest way to add a function. A function is a predefined formula that has a name (such as SUM and AVERAGE).



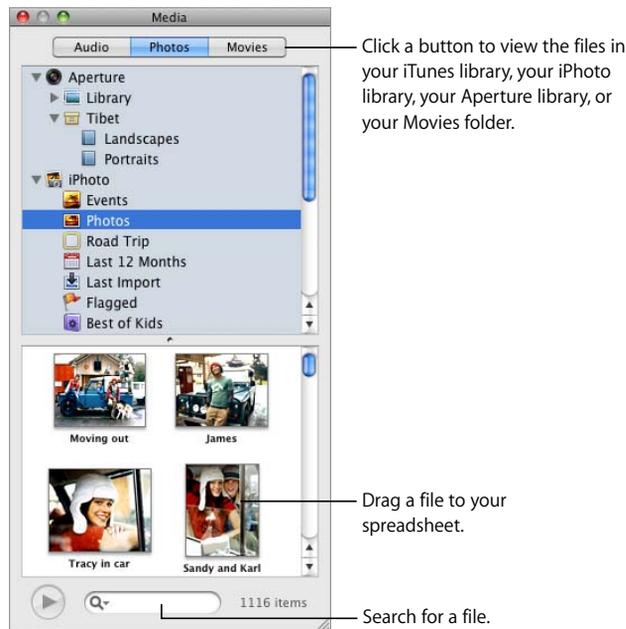
To open the Function Browser, click the Function Browser button in the Formula Bar.



“Using Functions” on page 96 tells you how to use the Function Browser.

## The Media Browser

The Media Browser provides access to all the media files in your iPhoto library, your iTunes library, and your Movies folder. You can drag an item from the Media Browser to your spreadsheet or to an image well in an inspector.



**Here are ways to open the Media Browser:**

- Click Media in the toolbar.
- Choose View > Show Media Browser.

## The Colors Window

You use the Mac OS X Colors window to choose colors for text, table cells, cell borders, and other objects. While you can also use the Format Bar to apply colors, the Colors window offers advanced color management options.

**To open the Colors window:**

- Click Colors in the toolbar.

For more information, see “Using the Colors Window” on page 161.

## The Font Panel

Using the Mac OS X Font panel, accessible from any application, you can change a font's typeface, size, and other options. Use the Format Bar for quick font formatting, but use the Font panel for advanced font formatting.

### To open the Font panel:

- Click Fonts in the toolbar.

For more detailed information about using the Font panel and changing the look of text, see "Using the Font Panel to Format Text" on page 123.

## The Warnings Window

When you import a document into Numbers, or export a Numbers spreadsheet to another format, some elements might not transfer as expected. The Document Warnings window lists any problems encountered.

If problems are encountered, you'll see a message enabling you to review the warnings. If you choose not to review them, you can see the Warnings window at any time by choosing View > Show Document Warnings.

If you see a warning about a missing font, you can select the warning and click Replace Font to choose a replacement font.

You can copy one or more warnings by selecting them in the Document Warnings window and choosing Edit > Copy. You can then paste the copied text into an email message, text file, or some other window.

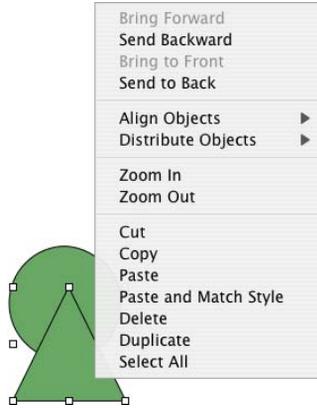
## Keyboard Shortcuts and Shortcut Menus

You can use the keyboard to perform many of the Numbers menu commands and tasks. To see a comprehensive list of keyboard shortcuts, open Numbers and choose Help > Keyboard Shortcuts.

Many objects also have shortcut menus with commands you can use on the object. Shortcut menus are especially useful for working with tables and charts.

### To open a shortcut menu:

- Press the Control key while you click an object.



This chapter describes how to manage Numbers spreadsheets.

You can create a Numbers spreadsheet by opening Numbers and choosing a template. You can also import a document created in another application, such as Microsoft Excel or AppleWorks 6. This chapter tells you how to create new Numbers spreadsheets, as well as how to open existing spreadsheets and save spreadsheets.

This chapter also provides instructions for using sheets and managing the layout of printed or PDF versions of Numbers sheets.

## Creating, Opening, and Importing Spreadsheets

When you create a new Numbers spreadsheet, you pick a template to provide its initial format and content. You can also create a new Numbers spreadsheet by importing a document created in another application, such as Microsoft Excel or AppleWorks.

### Creating a New Spreadsheet

To create a new Numbers spreadsheet, you pick the template that provides appropriate formatting and content characteristics.

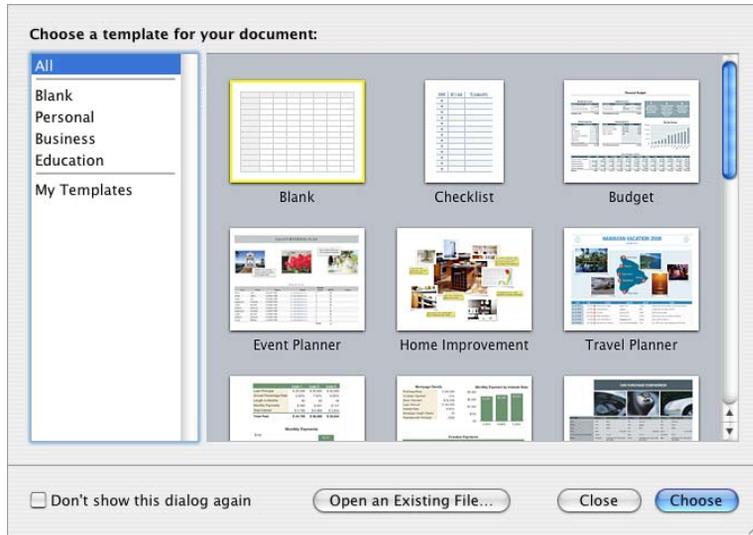
Start with the Blank template to build your spreadsheet from scratch. Or select one of the many other templates to create a budget, plan a party, and more without having to do all the design work. Many templates include predefined tables, charts, and sample data to give you a head start with your spreadsheet.

### To create a new spreadsheet:

- 1 Open Numbers by clicking its icon in the Dock or by double-clicking its icon in the Finder.

If Numbers is open, choose File > New from Template Chooser.

- 2 In the Template Chooser window, select a template category in the left column to display related templates, and then select the template that best matches the spreadsheet you want to create. If you want to begin in a spreadsheet without any predefined content, select Blank.



- 3 Click Choose. A new spreadsheet opens on your screen.

To open a Blank template and bypass the Template Chooser window when you create a new spreadsheet, select “Don’t show this dialog again.” To make the Template Chooser reappear when you create a new spreadsheet, choose Numbers > Preferences, click General, and then select “For New Documents: Show Template Chooser dialog.” Or you can choose File > New from Template Chooser.

You can also have Numbers automatically open a particular template every time you open Numbers or create a new spreadsheet. Choose Numbers > Preferences, click General, select “For New Documents: Use template: *template name*,” and then click Choose. Select a template name, and then click Choose.

## Importing a Document

You can create a new Numbers spreadsheet by importing a document created in Microsoft Excel or AppleWorks 6. Numbers can also import files in comma-separated value (CSV) format, tab-delimited format, and Open Financial Exchange (OFX) format.

From AppleWorks, you can only import spreadsheets.

### Here are ways to import a document:

- Drag the document to the Numbers application icon. A new Numbers spreadsheet opens, and the contents of the imported document are displayed.
- Choose File > Open, select the document, and then click Open.
- You can import Address Book data to quickly create tables that contain names, phone numbers, addresses, and other information for your contacts. See “Using Address Book Fields” on page 179 for instructions.

If you can't import a document, try opening the document in another application and saving it in a format Numbers can read, or copy and paste the contents into an existing Numbers spreadsheet.

You can also export Numbers spreadsheets to Microsoft Excel, PDF, and CSV files. See “Exporting to Other Document Formats” on page 186 for details.

## Opening an Existing Spreadsheet

There are several ways to open a spreadsheet that was created using Numbers.

### Here are ways to open a spreadsheet:

- To open a spreadsheet when you're working in Numbers, choose File > Open, select the spreadsheet, and then click Open.
- To open a spreadsheet you've worked with recently, choose File > Open Recent and choose the spreadsheet from the submenu.
- To open a Numbers spreadsheet from the Finder, double-click the spreadsheet icon or drag it to the Numbers application icon.

If you see a message that a font or file is missing, you can still use the spreadsheet. Numbers lets you choose fonts to substitute for missing fonts. Or you can add missing fonts by quitting Numbers and adding the fonts to your Fonts folder (for more information, see Mac Help). To make missing movies or sound files reappear, add them to the spreadsheet again.

## Saving Spreadsheets

When you create a Numbers spreadsheet, all of the graphics are saved with the spreadsheet so they display correctly if the spreadsheet is opened on another computer. Fonts, however, are not included as part of the spreadsheet. If you transfer a Numbers spreadsheet to another computer, make sure the fonts used in the spreadsheet have been installed in the Fonts folder of that computer.

You can choose whether to save audio and movie files with a Numbers spreadsheet. If you don't save them with the spreadsheet, you need to transfer them separately to view the spreadsheet on another computer.

### Saving a Spreadsheet

It's a good idea to save your spreadsheet often as you work. After you've saved it for the first time, you can press Command-S to re-save it using the same settings.

**To save a spreadsheet for the first time:**

- 1 Choose File > Save, or press Command-S.
- 2 In the Save As field, type a name for the spreadsheet.
- 3 If your file directory isn't visible in the Where pop-up menu, click the disclosure triangle to the right of the Save As field.
- 4 Choose where you want to save the spreadsheet.
- 5 If you or someone else will open the spreadsheet on another computer, click Advanced Options and set up options that determine what's copied into your spreadsheet.

*Copy audio and movies into document:* Selecting this checkbox saves audio and video files with the spreadsheet, so the files play if the spreadsheet is opened on another computer. You might want to deselect this checkbox so that the file size is smaller, but media files won't play on another computer unless you transfer them as well.

*Copy template images into document:* If you don't select this option and you open the spreadsheet on a computer that doesn't have Numbers installed, the spreadsheet might look different.

- 6 Click Save.

You can generally save Numbers spreadsheets only to computers and servers that use Mac OS X. Numbers is not compatible with Mac OS 9 computers and Windows servers running Services for Macintosh. If you must use a Windows computer, try using AFP server software available for Windows to do so.

If you plan to share the spreadsheet with others who don't have Numbers installed on their computers, you can export it for use in another application. To learn about exporting your spreadsheet in other file formats, see "Exporting to Other Document Formats" on page 186.

You can also send a spreadsheet to iWeb. For more information, see “Sending a Spreadsheet to iWeb” on page 187.

## Undoing Changes

If you don't want to save changes you made to your spreadsheet since opening it or last saving it, you can undo them.

### Here are ways to undo changes:

- To undo your most recent change, choose Edit > Undo.
- To undo multiple changes, choose Edit > Undo multiple times. You can undo any changes you made since opening the spreadsheet or reverting to the last saved version.
- To restore changes you've undone using Edit > Undo, choose Edit > Redo one or more times.
- To undo all changes you made since the last time you saved your spreadsheet, choose File > “Revert to Saved” and then click Revert.

## Automatically Saving a Backup Version of a Spreadsheet

Each time you save a spreadsheet, you can save a copy without the changes you made since last saving it. That way, if you change your mind about edits you have made, you can go back to (revert to) the backup version of the spreadsheet.

### Here are ways to create and use a backup version:

- To automatically save a backup version of a spreadsheet, choose Numbers > Preferences, click General, and then select “Back up previous version when saving.”

The next time you save your spreadsheet, a backup version is created in the same location, with “Backup of” preceding the filename. Only one version—the last saved version—is backed up. Every time you save the spreadsheet, the old backup file is replaced with the new backup file.

- To revert to the last saved version after making unsaved changes, choose File > Revert to Saved. The changes in your open spreadsheet are undone.

## Saving a Spreadsheet as a Template

When you save a spreadsheet as a template, it appears in the Template Chooser.

### To save a spreadsheet as a template:

- Choose File > Save as Template.

See “Designing a Template” on page 188 for additional details.

## Saving Search Terms for a Spreadsheet

You can store such information as author name and keywords in Numbers spreadsheets, and then use Spotlight to locate spreadsheets containing that information.

**To store information about a spreadsheet:**

- 1 Click Inspector in the toolbar, and then click the Document Inspector button.
- 2 In the Spotlight fields, enter or change information.



To search for spreadsheets containing Spotlight information, click the Spotlight icon at the top right of the menu bar, and then type what you want to search for.

## Saving a Copy of a Spreadsheet

If you want to make a copy of your spreadsheet (for example, to create a backup copy or multiple versions), you can save it using a different name or location. (You can also automate saving a backup version, as “Automatically Saving a Backup Version of a Spreadsheet” describes.)

**To save a copy of a spreadsheet:**

- Choose File > Save As and specify a name and location.

The spreadsheet with the new name remains open. To work with the previous version, choose File > Open Recent and choose the previous version from the submenu.

## Closing a Spreadsheet Without Quitting Numbers

When you have finished working with a spreadsheet, you can close it without quitting Numbers.

**To close the active spreadsheet and keep the application open:**

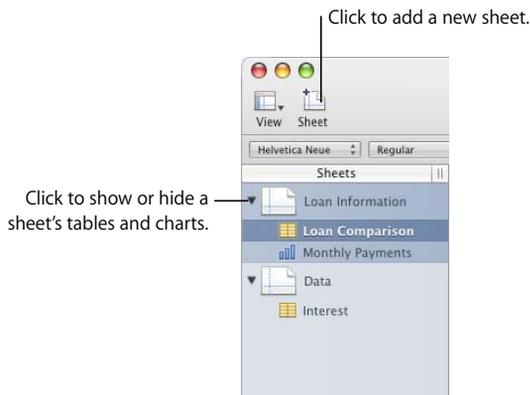
- Choose File > Close or click the close button in the upper-left corner of the Numbers window.

If you've made changes since you last saved the spreadsheet, Numbers prompts you to save.

## Using Sheets to Organize a Spreadsheet

Like chapters in a book, sheets let you divide information into manageable groups. For example, you might want to place charts in the same sheet as the tables whose data they display. Or you may want to place all the tables on one sheet and all the charts on another sheet. You might want to use one sheet for keeping track of business contacts and other sheets for friends and relatives.

The sheets in a spreadsheet and the tables and charts on each sheet are represented in the Sheets pane, located to the left of the canvas above the styles pane.



Only tables and charts are listed for any sheet, even if you have text, images, and other objects in your spreadsheet.

The order of a sheet's tables and charts in the Sheets pane may not match their order in the spreadsheet, as "Reorganizing Sheets and Their Contents" on page 38 describes.

## Viewing Sheets

The Sheets pane on the left of the Numbers window lists all the sheets in your spreadsheet and the tables and charts in each sheet.

### Here are ways to see a sheet's tables and charts:

- To show or hide all a sheet's tables and charts in the Sheets pane, click the triangle to the left of the sheet in the pane.
- To display the contents of a sheet, click the sheet in the Sheets pane.

When you're working on a table or chart in the spreadsheet, the table or chart is highlighted in the Sheets pane.

## Adding and Deleting Sheets

There are several ways to add and delete sheets.

### Here are ways to create and remove sheets:

- To add a new sheet, click the Sheet button in the toolbar. You can also choose Insert > Sheet.

A new sheet containing a predefined table is added at the bottom of the Sheets pane. You can move the sheet by dragging it to a new location in the Sheets pane.

- To add a sheet that's a copy of a sheet in the spreadsheet, select the sheet to copy, choose Edit > Copy, select the sheet after which you want the copy located, and choose Edit > Paste.
- To delete a sheet and its contents, select it in the Sheets pane and press the Delete key.

When you add a sheet, Numbers assigns it a default name, but you can change the name, as "Changing Sheet Names" on page 39 describes.

## Reorganizing Sheets and Their Contents

In the Sheets pane, you can move sheets around and reorder their tables and charts. You can also move tables and charts from one sheet to another.

Reordering tables and charts in the Sheets pane doesn't affect their location in a sheet. In a sheet in the Sheets pane, for example, you may want to place charts next to the tables they're derived from, or list tables in the order in which you want to work on them. But in the sheet itself, you may want to present these objects in a different order (for example, when you lay out your spreadsheet for printing).

### Here are ways to reorganize sheets in the Sheets pane:

- To move a sheet, select it and drag it to a new location in the pane. Sheets shift to make room for your insertion as you drag.  
You can also select multiple sheets and move them as a group.
- To copy (or cut) and paste sheets, select the sheets, choose Edit > Cut or Edit > Copy, select the sheet after which you want to place the sheets you're moving, and choose Edit > Paste.
- To move one or more tables and charts associated with a sheet, select them and drag them to a new location in the same sheet or to a different sheet.

You can also use cut/paste or copy/paste actions to move tables and charts in the pane.

To move an object within a sheet in the spreadsheet, select it and drag it to a different location, or use cut/paste or copy/paste actions. To place objects on specific pages, follow the instructions in "Dividing a Sheet into Pages" on page 39.

## Changing Sheet Names

A name distinguishes each sheet in the Sheets pane. The sheet name is assigned by default when you add a sheet, but you can change it to a more descriptive name.

Here are ways to change a sheet's name:

- In the Sheets pane, double-click the name and edit it.
- In the Sheet Inspector, edit the name in the Name field.

You can also change the names of a sheet's tables and charts. See "Naming Tables" on page 49 and "Using a Chart Title" on page 107 for instructions.

## Dividing a Sheet into Pages

Using Print View, you can view a sheet as individual pages, moving and resizing objects until you achieve the layout you want for a printed or PDF version of the sheet. You can also add headers, footers, page numbers, and more.

Footer area

Header area

Task	Total Cost	Notes
Appliances	\$1,200.00	
Cabinets	\$4,000.00	
Cabinet Hardware	\$250.00	
Countertops	\$2,000.00	
Plumbing	\$1,250.00	
Furniture	\$1,200.00	
Floor	\$3,200.00	
Lighting	\$475.00	
Paint	\$600.00	
<b>Total</b>	<b>\$12,975.00</b>	

Cost Overview

Category	Percentage
Appliances	30%
Cabinets	20%
Cabinet Hardware	2%
Countertops	15%
Plumbing	10%
Furniture	9%
Floor	25%
Lighting	4%
Paint	6%

Click to view pages in landscape (horizontal) orientation.

Click to view pages in portrait (vertical) orientation.

Click to choose a page zoom level that lets you see more or fewer pages.

Click to show or hide Print View.

Slide to shrink or enlarge all the sheet's objects.

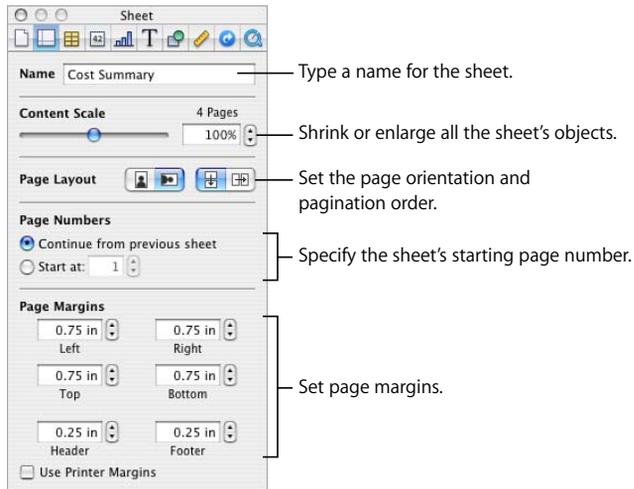
50% Content Scale: 100%

### Here are ways to show or hide Print View:

- Click View in the toolbar, and then choose Show Print View or Hide Print View.
- Choose File > Show Print View, View > Show Print View, File > Hide Print View, or View > Hide Print View.
- Click the page icon next to the page zoom control in the lower left of the canvas.

When you use Print View, the zoom level you choose from the pop-up menu in the lower left determines how many pages you can view in the window at one time.

You set up page attributes, such as page orientation and margins, separately for each sheet, using the Sheet Inspector.



## Setting a Spreadsheet's Page Size

Before working with Print View, set the size of the pages to reflect the size of the paper you'll be using.

### To set the page size:

- 1 Click Inspector in the toolbar, and then click the Document Inspector button.
- 2 Choose a page size from the Paper Size pop-up menu.

## Using Headers and Footers

You can have the same text appear on multiple pages in a sheet. Recurring information that appears at the top of the page is called a *header*; at the bottom it's called a *footer*.

You can put your own text in a header or footer, and you can use formatted text fields. Formatted text fields allow you to insert text that is automatically updated. For example, inserting the date field shows the current date whenever you open the spreadsheet. Similarly, page number fields keep track of page numbers as you add or delete pages.

### To define the contents of a header or footer:

- 1 Click View in the toolbar and choose Show Print View.
- 2 To see header and footer areas, hover the pointer near the top or bottom of a page. You can also click View in the toolbar and choose Show Layout.
- 3 To add text to a header or footer, place the insertion point in the header or footer and insert text.
- 4 To add page numbers or other changeable values, see the instructions in "Inserting Page Numbers and Other Changeable Values" on page 145.

## Arranging Objects on a Page

Resize objects, move them around on a page or between pages, and break up long tables across pages when you're viewing a sheet in Print View.

To show Print View, click View in the toolbar and choose Show Print View.

### Here are ways to lay out objects on a selected sheet's pages:

- To adjust the size of all the objects in the sheet in order to change the number of pages they occupy, use the Content Scale controls in the Sheet Inspector. You can also drag the Content Scale slider at the bottom left of the canvas to resize everything on a sheet.
- To resize individual objects, select them and drag their selection handles or change the Size field values in the Metrics Inspector. To resize a table, see "Resizing a Table" on page 48. To resize a chart, see "Resizing a Chart" on page 107. To resize other objects, see "Resizing Objects" on page 154.
- Header rows and header columns can be set to appear on each page if a table spans more than one page by selecting "Repeat header cells on each page" in the Table Inspector. You can also choose Table > Repeat Header Rows or Table > Repeat Header Columns.

To avoid showing header rows or columns when a table spans pages, deselect “Repeat header cells on each page” in the Table Inspector or choose Table > Don’t Repeat Header Rows or Table > Don’t Repeat Header Columns.

- Move objects from page to page by dragging them or by cutting and pasting them.

## Setting Page Orientation

You can lay out pages in a sheet in a vertical orientation (portrait) or a horizontal orientation (landscape).

**To set a sheet’s page orientation:**

- 1 Click View in the toolbar and choose Show Print View.
- 2 Click Inspector in the toolbar, click the Sheet Inspector button, and click the appropriate page orientation button in the Page Layout area of the pane.

You can also click a page orientation button at the bottom left of the canvas.

## Setting Pagination Order

You can order pages viewed in page mode from left to right or from top to bottom when you print them or create a PDF.

**To set pagination order:**

- Click Inspector in the toolbar, click the Sheet Inspector button, and then click the top-to-bottom or left-to-right button in the Page Layout area of the pane.

## Numbering Pages

You can display page numbers in a page’s header or footer.

**To number a sheet’s pages:**

- 1 Select the sheet.
- 2 Click View in the toolbar and choose Show Print View.
- 3 Click View in the toolbar and choose Show Layout so you can see the headers and footers.

You can also see the headers and footers by hovering the pointer over the top or bottom of a page.

- 4 Click into the first header or footer to add a page number, following the instructions in “Inserting Page Numbers and Other Changeable Values” on page 145.
- 5 Click Inspector in the toolbar, click the Sheet Inspector button, and then specify the starting page number.

To continue page numbers from the previously selected sheet, select “Continue from previous sheet.”

To start the sheet’s page numbers at a particular number, use the Start At field.

## Setting Page Margins

In Print View, every sheet's page has margins (blank space between the sheet's edge and the edges of the paper). These margins are indicated onscreen by light gray lines, visible when you use layout view.

### To set the page margins for a sheet:

- 1 Select the sheet in the Sheets pane.
- 2 Click View in the toolbar and choose Show Print View and Show Layout.
- 3 Click Inspector in the toolbar, and then click the Sheet Inspector button.
- 4 To set the distance between the layout margins and the left, right, top, and bottom sides of a page, enter values in the Left, Right, Top, and Bottom fields.
- 5 To set the distance between a header or a footer and the top or bottom edge of the page, enter values in the Header and Footer fields.

To print the spreadsheet using the largest printing area possible with any printer you use, select Use Printer Margins. Any margin settings specified in the Sheet Inspector will be ignored when you print.

## This chapter tells you how to add and format tables and cell values.

Several other chapters provide instructions that focus on particular aspects of tables:

- To learn about using styles to format tables, see Chapter 4, “Working with Table Styles,” on page 79.
- To learn about using formulas in table cells, see Chapter 5, “Using Formulas and Functions in Tables,” on page 83.
- To learn about displaying table values in charts, see Chapter 6, “Using Charts,” on page 98.

## About Tables

Tables help you organize, analyze, and present data.

Numbers provides a wide variety of options for building and formatting tables and handling values of different types. You can also use special operations such as sorting and conditional formatting (a technique for automating the monitoring of cell values).

- “Working with Tables” on page 45 teaches you how to add tables, resize them, move them, name them, and more.
- “Selecting Tables and Their Components” on page 51 describes how to select tables, columns, and other table elements in order to work with them.
- “Working with Content in Table Cells” on page 54 tells you how to add text, numbers, dates, images, and other content to table cells as well as how to monitor cell values automatically.
- “Working with Rows and Columns” on page 69 covers adding rows and columns, resizing them, and more.
- “Working with Table Cells” on page 74 contains instructions for splitting cells, merging them, and copying and moving them as well as formatting cell borders.
- “Reorganizing Tables” on page 77 describes how to sort and filter rows.

## Working with Tables

Use a variety of techniques to create tables and manage their characteristics, size, and location.

### Adding a Table

While most templates contain one or more predefined tables, you can add additional tables to your Numbers spreadsheet.

#### Here are ways to add a table:

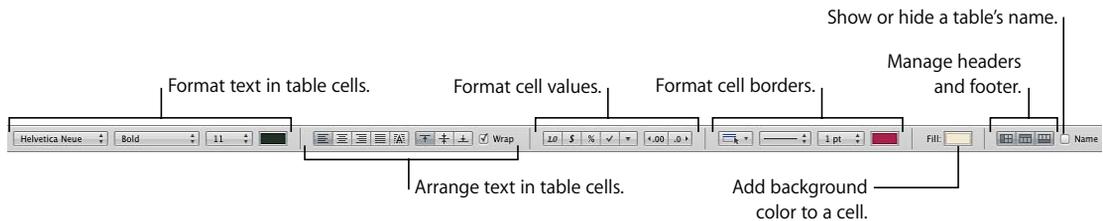
- Click Tables in the toolbar and choose a predefined table from the pop-up menu.  
You can add your own predefined tables to the pop-up menu. See “Defining Reusable Tables” on page 49 for instructions.
- Choose Insert > Table > *table*.
- To create a new table based on one cell or several adjacent cells in an existing table, select the cell or cells, click and hold the selection, and then drag the selection to the sheet. To retain values in the selected cells in the original table, hold down the Option key while dragging.  
See “Selecting Tables and Their Components” on page 51 to learn about cell selection techniques.
- To create a new table based on an entire row or column in an existing table, click the reference tab associated with the row or column, click and hold the reference tab, drag the row or column to the sheet, and then release the tab. To retain values in the column or row in the original table, hold down the Option key while dragging.

### Using Table Tools

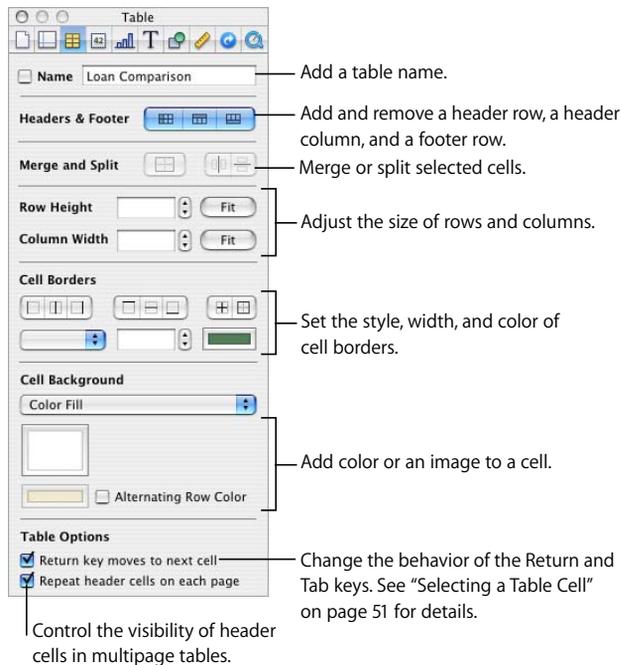
You can format a table and its columns, rows, cells, and cell values using various Numbers tools.

#### Here are ways to manage table characteristics:

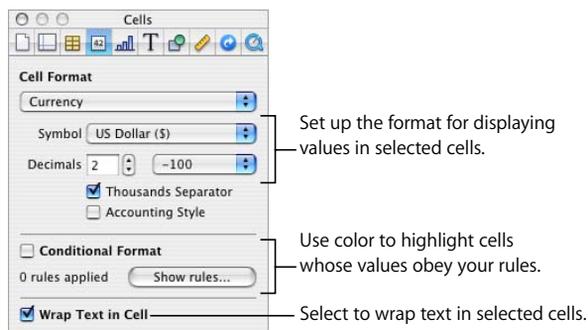
- Select a table and use the Format Bar to quickly format the table.



- Use the Table Inspector to access table-specific controls, such as fields for precisely controlling column width and row height. To open the Table Inspector, click Inspector in the toolbar, and click the Table Inspector button.



- Use the Cells Inspector to format cell values. For example, you can display a currency symbol in cells containing monetary values. You can also set up conditional formatting. For example, you can make a cell red when its value exceeds a particular number. To open the Cells Inspector, click Inspector in the toolbar, and click the Cells Inspector button.



- Use table styles to adjust the appearance of tables quickly and consistently. See “Using Table Styles” on page 79 for more information.
- Use the reference tabs and handles that appear when you select a table cell to quickly reorganize a table, select all the cells in a row or column, add or delete rows and columns, and more.

Drag the Table handle to move the table.

Reference tab letters can be used to refer to columns.

Click the Column handle to add one column. Drag it to add multiple columns.

Drag the Column and Row handle down to add rows. Drag it to the right to add columns.

Click the Row handle to add one row. Drag it to add more rows.

Reference tab numbers can be used to refer to rows.

	A	B	C	D
1		Loan 1	Loan 2	Loan 3
2	Loan Principal	\$30,000	\$30,000	\$30,000
3	Annual Percentage Rate	6.00%	7.50%	9.00%
4	Length in Months	60	60	48
5	Monthly Payments	\$580	\$601	\$747
6	Total Interest	\$4,799	\$6,068	\$5,834
7	Total Paid	\$34,799	\$36,068	\$35,834

You also use reference tabs when you work with formulas (“Using Cell References” on page 91 tells you how).

- Use the Graphics Inspector to create special visual effects, such as shadows. To open the Graphics Inspector, click Inspector in the toolbar and then click the Graphics Inspector button.
- Access a shortcut menu by selecting a table or cell(s) and then holding down the Control key as you click again.

You can also use the pop-up menus on the column and row reference tabs.

	A	B	C	D
1		Loan 1	Loan 2	Loan 3
2	Loan Principal	\$30,000	\$30,000	\$30,000
3	Annual Percentage Rate	6.00%	7.50%	9.00%
4	Length in Months	60	60	48
5	Monthly Payments	\$580	\$601	\$747
6	Total Interest	\$4,799	\$6,068	\$5,834
7	Total Paid	\$34,799	\$36,068	\$35,834

- Sort Ascending
- Sort Descending
- Add Column Before
- Add Column After
- Delete Column
- Hide Column
- Unhide All Columns
- Show Sort & Filter Panel

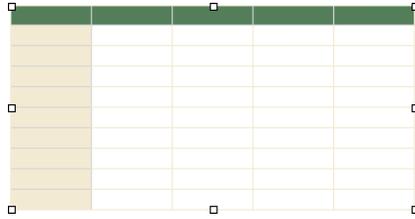
- Use the Formula Editor and Formula Bar to add and edit formulas. See “Using the Formula Editor” on page 88 and “Using the Formula Bar” on page 90 for details.
- Use the Formula Browser to add and edit functions. See “Using Functions” on page 96 for details.

## Resizing a Table

You can make a table larger or smaller by dragging one of its selection handles or by using the Metrics Inspector. You can also change the size of a table by resizing its columns and rows.

**Here are ways to resize a table that's selected:**

- Drag one of the square selection handles that appear when a table is selected. See “Selecting a Table” on page 51 for instructions.



To maintain a table's proportions, hold down the Shift key as you drag to resize the table.

To resize from the table's center, hold down the Option key as you drag.

To resize a table in one direction, drag a side handle instead of a corner handle.

- To resize by specifying exact dimensions, select a table or table cell, click Inspector in the toolbar, and then click the Metrics Inspector button. Using the Metrics Inspector, you can specify a new width and height, and you can change the table's distance from the margins by using the Position fields.
- If a table spans more than one page, you must use the Metrics Inspector to resize the table. To resize by adjusting the dimensions of rows and columns, see “Resizing Table Rows and Columns” on page 73.

## Moving Tables

You can move a table by dragging it, or you can relocate a table using the Metrics Inspector.

**Here are ways to move a table:**

- If the table isn't selected, click and hold at the edge of the table, and drag the table. If the table is selected, drag the table while holding down the Table handle in the upper left.
- To constrain the movement to horizontal, vertical, or 45 degrees, hold down the Shift key as you drag.

- To move a table more precisely, click any cell, click Inspector in the toolbar, click the Metrics Inspector button, and then use the Position fields to relocate the table.
- To copy a table and move the copy, hold down the Option key, click and hold at the edge of an unselected table, and drag.

## Naming Tables

Every Numbers table has a name that's displayed in the Sheets pane and can optionally be displayed above the table. The default table name (Table 1, Table 2, and so forth) can be changed, hidden, and formatted, but not moved or resized.

### Here are ways to work with table names:

- To change the name, edit it in the Sheets pane or in the Table Inspector's Name field.  
On any sheet, two tables can't have the same name.
- To show the table name on the sheet, select Name in the Format Bar or the Table Inspector.  
To hide the table name on the sheet, deselect Name.
- To format the name, make sure the table isn't selected, select Name in the Format Bar or the Table Inspector, click the table name to select the name region on the sheet, and use the Format Bar, Font panel, or Text pane of the Text Inspector.
- To increase the distance between the table name and the table body, select Name in the Table Inspector, click the name on the canvas, and then use the Text Inspector to modify the After Paragraph value.

## Defining Reusable Tables

You can add your own tables to the menu of predefined tables that appears when you click Tables in the toolbar or choose Insert > Table. Reusable tables have the table style and geometry of your choice and can contain content (header text, formulas, and so forth).

### To define a reusable table:

- 1 Select a table.
- 2 Define a table style for the table. The table style determines the formatting of borders, background, and text in the table's cells.

One way to define the table style is by following the instructions in "Modifying a Table's Style" on page 80.

Alternatively, you can use the default table style that's in effect when you add a table to the spreadsheet that's based on the reusable table. (See "Using the Default Table Style" on page 81 to learn about the default table style.) Step 7 tells you how to use this option.

**3** Define the table's geometry.

To resize the table, see "Resizing a Table" on page 48 and "Resizing Table Rows and Columns" on page 73.

To define columns and rows, see "Working with Rows and Columns" on page 69.

To split or merge, and resize table cells, see "Splitting Table Cells" on page 74 or "Merging Table Cells" on page 74.

**4** Add and format any content you want to reuse. See "Working with Content in Table Cells" on page 54 for instructions. Any formulas you add should refer only to cells in the table you're defining.

**5** Choose Format > Advanced > Capture Table.

**6** Type a name for the table.

**7** Select "Use the default style from the document" if you want the table to be styled using the default table style in effect when the table is added to the spreadsheet. Otherwise the table style used is the one you defined in step 2.

**8** Click OK.

A copy of your reusable table can now be added to the current spreadsheet by choosing it from the menu of predefined tables that appears when you click Tables in the toolbar or choose Insert > Table.

To rearrange, rename, or delete tables on the menu, choose Format > Advanced > Manage Tables. Double-click a name to change the name of a predefined table. Select a table and click the up or down arrow buttons to move it up or down in the list of tables. Click the Delete (-) button to remove a table. Click Done when you've finished.

The table and menu changes apply only to the current spreadsheet. If you want your reusable tables and menu changes to be available in other spreadsheets, save the spreadsheet as a template, using the instructions in "Designing a Template" on page 188.

## Copying Tables Among iWork Applications

You can copy a table from one iWork application to another.

The table retains its appearance, data, and other attributes, but some Numbers features aren't supported in the other applications:

- Rows or columns that are hidden in Numbers aren't visible in the other applications until you select the table and choose Format > Table > Unhide All Rows or Unhide All Columns.
- Comments added to Numbers table cells aren't copied.

### To copy a table from one iWork application to another:

- 1 Select the table you want to copy, as “Selecting a Table” on page 51 describes.
- 2 Choose Edit > Copy.
- 3 In the other application, set an insertion point for the copied table, and then choose Edit > Paste.

## Selecting Tables and Their Components

You select tables, rows, columns, table cells, and table cell borders before you work with them.

### Selecting a Table

When you select a table, selection handles appear on the edges of the table.

#### Here are ways to select a table:

- If the table cell isn’t selected, move your pointer to the edge of the table. When the pointer changes to include a black cross, and you can click to select the table.



- If a table cell or border segment is selected, click the Table handle in the upper left to select the table. You can also press Command-Return.

### Selecting a Table Cell

When you select a cell, the border of the selected cell is highlighted.

Selecting a cell also displays reference tabs along the top and sides of the table.

#### To select a single table cell:

- 1 Move the pointer over the cell. The pointer changes into a white cross.



- 2 Click the cell.

When a cell is selected, use the Tab, Return, and arrow keys to move the selection to an adjacent cell. Selecting “Return key moves to next cell” under Table Options in the Table Inspector sometimes changes the effect of the Return and Tab keys.

To select	If “Return key” option is selected	If “Return key” option isn’t selected
The next cell to the right	Press Tab. If you press Tab when the last cell in a column is selected, a new column is added. If you add or change data in the last column, press Tab twice to add a new column.	Press Tab. If you press Tab in the last cell of the table, a new row is added.
The previous cell	Press Shift-Tab.	Press Shift-Tab. If you press Shift-Tab in the first cell, the last cell is selected.
The next cell down	Press Down Arrow or Return. If you’ve been using the Tab key to navigate between cells, pressing Return selects the next cell down from the cell in which you started tabbing. If you press Return when the last cell in a row is selected, a new row is added. If you add or change data in the last cell, press Return twice to add a new row.	Press Down Arrow.
The next cell up	Press Up Arrow or Shift-Return.	Press Up Arrow.

## Selecting a Group of Table Cells

You can select adjacent or nonadjacent cells.

### Here are ways to select a group of cells:

- To select adjacent table cells, select a single cell, and then hold down the Shift key as you select adjacent cells.  
You can also click a cell, hold it, and then drag through a range of cells.
- To select nonadjacent table cells, hold down the Command key as you select cells. Use Command-click to deselect a cell in the group.

## Selecting a Row or Column

Select rows and columns using their reference tabs.

To select an entire row or column:

- 1 Select any table cell so that the reference tabs are showing.
- 2 To select a column, click its reference tab (above the column).  
To select a row, click its reference tab (to the left of the row).

## Selecting Table Cell Borders

Select cell border segments when you want to format them. A *single border segment* is one side of a cell. A *long border segment* includes all adjacent single border segments.

A diagram of a table with columns A, B, C, and D, and rows 1 through 7. The table contains the following data:

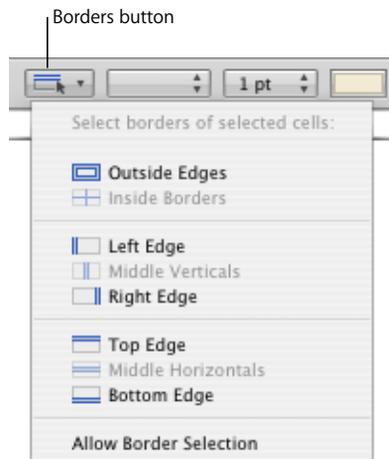
	A	B	C	D
1		Loan 1	Loan 2	Loan 3
2	Loan Principal	\$30,000	\$30,000	\$30,000
3	Annual Percentage Rate	6.00%	7.50%	9.00%
4	Length in Months	60	60	48
5	Monthly Payments	\$580	\$601	\$747
6	Total Interest	\$4,799	\$6,068	\$5,834
7	Total Paid	\$34,799	\$36,068	\$35,834

Labels and arrows pointing to border segments:

- A single (horizontal) border segment: points to the top border of cell B2.
- A single (vertical) border segment: points to the right border of cell C3.
- A long (vertical) border segment: points to the right border of cell C4.
- A long (horizontal) border segment: points to the bottom border of cell B7.

Here are ways to select border segments:

- To select border segments in a single step, select a table, row, column, or cell.  
Click the Borders button in the Format Bar, and choose an option from the pop-up menu.



You can also use the Cell Borders buttons in the Table Inspector to select a border segment.

- To select and deselect segments by clicking them in a table, use border selection mode. Choose Allow Border Selection from the Borders pop-up menu in the Format Bar or choose Table > Allow Border Selection, and then select the table you want to work with.

The pointer changes shape when it's over a horizontal or vertical segment. The pointer appears to straddle the segment.



The pointer looks like this when it's over a horizontal segment.



The pointer looks like this when it's over a vertical segment.

To select a long segment, click a cell's horizontal or vertical border. To change the selection to a single segment, click it again.

Click to go back and forth between single-segment and long-segment selection.

To add a single or long segment to the selection, hold down the Shift or Command key while clicking.

To deselect a selected single segment, click it while holding down the Shift or Command key.

To stop using border selection mode, choose Disallow Border Selection from the Borders pop-up menu in the Format Bar or choose Table > Disallow Border Selection.

## Working with Content in Table Cells

You can add text, numbers, and dates to table cells, and you can format values in cells. You can also add images and background color, as well as checkboxes, sliders, and other controls. And you can use autofilling to use the content in one or more cells to automatically add values to adjacent cells.

### Adding and Editing Cell Values

You can add, change, and delete the content in cells.

**Here are ways to add and edit values:**

- If the cell is empty, select it and then type a value. "Selecting a Table Cell" on page 51 tells you how to select cells.
- To replace specific content already in the cell, select the cell and then select what you want to replace by double-clicking; hold down the Shift key and select more content if you want to replace more. Type to replace the selected content.

- To replace everything in the cell, select the cell and then begin typing.  
If “Return key moves to next cell” isn’t selected in the Table Inspector, you can also select the cell and then press Return or Enter, which selects everything in the cell, and then start typing.
- To insert content within existing content, select the cell, click to set the insertion point, and begin typing.
- To undo changes made to a table cell since selecting the cell, press Esc.
- To delete the content of table cells, rows, or columns, select the cells, rows, or columns and then press the Delete key or choose Edit > Delete.  
To delete the contents, background fill, and any style settings, choose Edit > Clear All. The default style is applied to the selection.
- To copy, paste, and move cell values, see the instructions in “Copying and Moving Cells” on page 76.
- To add formulas and functions to cells, see the instructions in “Using Formulas” on page 83 and “Using Functions” on page 96.

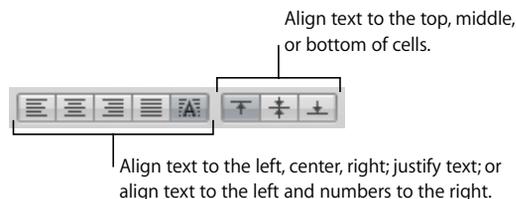
## Working with Text in Cells

You can control the format and alignment of text in table cells, and you can use find/replace and spell-checking features.

When you type text into a cell, Numbers displays text that might be used to complete the cell content based on similar text elsewhere in the table. You can use the suggested text if it’s appropriate, or you can keep typing to override suggestions.

### Here are techniques for working with text in table cells:

- To insert a line break, press Control-Return.
- To insert a paragraph break, if “Return key moves to next cell” under Table Options in the Table Inspector isn’t selected, press Return. Otherwise, press Option-Return.
- To insert a tab in a table, press Option-Tab.
- To adjust text alignment, use the alignment buttons in the Format Bar.



The Text Inspector gives you additional text formatting options (click Inspector in the toolbar and click the Text Inspector button).



## Working with Dates in Cells

Unless a cell has a date and time format associated with it, when you type a value that can be interpreted as a date or time value, Numbers might reformat the value.

For example, if you type 1/22/45 or 1-22-45 into a table cell with the Automatic cell format and leave the cell, the value changes to Jan 22, 2045. If you enter a 2-digit year value greater than or equal to 50, Numbers adds the prefix “19”; otherwise Numbers adds the prefix “20.”

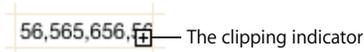
And if you type 12 pm, the value becomes 12:00 PM. You can edit the value if you need to change it.

See “Using the Date and Time Format” on page 62 to learn about the date and time format.

## Displaying Content Too Large for Its Cell

When a cell is too small to display all its content, here is what happens:

- If the content is a number or date, a clipping indicator appears.



- For other types of values, no clipping indicator appears. You can only see content that’s visible within the boundaries of its cell.

You can enlarge a cell so that more content is visible, and you can let numbers and dates spill into adjacent blank cells.

### Here are ways to handle content too large for a cell:

- To let a numeric or date value in a cell spill into adjacent cells, deselect Wrap Text in Cell in the Cells Inspector.

If the adjacent cells are empty, they’ll display spilled content. But if they contain data, content that doesn’t fit isn’t displayed and the clipping indicator appears.

To cause content to wrap instead of spill, select Wrap in the Format Bar or Wrap Text in the Cells Inspector.

- If cell values aren’t visible because columns are too narrow, you can use the Fit button next to the Column Width controls in the Table Inspector to make values visible. Select a cell, column(s), or the table, and then click the Fit button.

You can also resize a column by dragging the right border of its reference tab to the right, or by using the Column Width controls in the Table Inspector.

- If cell values aren't visible because rows are too narrow, you can use the Fit button next to the Row Height controls in the Table Inspector to make values visible. Select a cell, row(s), or the table, and then click the Fit button. As row content is added or removed, row height automatically changes to match content height.

You can also resize a row by clicking the bottom border of its reference tab and dragging down, or by using the Row Height controls in the Table Inspector.

- You can also resize columns and rows to accommodate content by using the reference tabs.

To increase the height of a row to accommodate its largest content, double-click the lower border of the row's reference tab. Column width does not adjust automatically when you make content changes.

To increase the width of a column to accommodate its largest content, double-click the right border of the column's reference tab.

## Formatting Cell Values

You can apply a format to a cell so its value is displayed in a particular way. For example, you can format cells that hold monetary values so that a currency symbol (such as \$, £, or ¥) appears in front of numbers in them. Or you can format cells to contain controls, such as checkboxes and sliders, which are used to add or change cell values.

When you use a cell format, you are only setting the display characteristics of a value. When the value is used in formulas, the actual value is used, not the formatted value. The only exception is when there are too many numbers following a decimal point, in which case the number is rounded.

You define cell formats using the Format Bar or the Cell Format pop-up menu in the Cells Inspector. To display cell values exactly as you type them, choose Automatic; otherwise, choose the item that provides the specific formatting you want to use.

### Here are ways to work with cell formats:

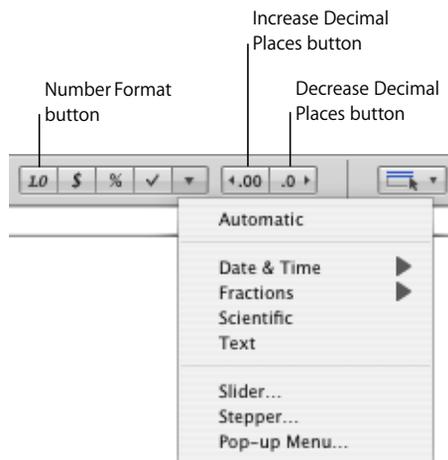
- To add a value to an empty cell that has a format, select the cell and enter a value. The format is applied when you leave the cell.
- To apply a cell format to an existing value, select one or more cells that contain values. Use the Cells Inspector or the Format Bar to define a cell format. The format you define is applied to values in the selected cell(s).
- To display a value exactly as you type it, select the cell, and then choose Automatic from the Format Bar or the Cell Format pop-up menu of the Cells Inspector. The value remains, but its formatting is removed.
- If you delete a value from a cell with a format, the format isn't deleted. To delete the format, choose Automatic from the Format Bar or the Cell Format pop-up menu of the Cells Inspector.

- After you define a cell format, you can associate the format with multiple cells by using autofilling. See “Autofilling Table Cells” on page 68 for instructions.

### Using the Number Format

Use the number format to format the display of a number’s decimal places, thousands separator, and negative values.

To define a number format that displays two decimal places, no thousands separator, and negative numbers with the negative symbol, select one or more cells and then click the Number Format button in the Format Bar. Use the Decrease Decimal Places and Increase Decimal Places buttons located nearby to change the number of decimal places.



For more control over the number format, use the Cells Inspector.

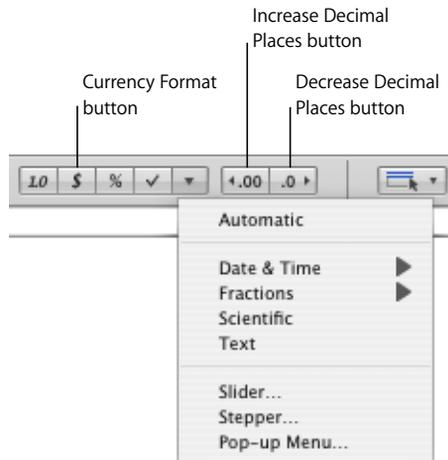
#### To define a number format using the Cells Inspector:

- 1 Select the cell or cells.
- 2 Click Inspector in the toolbar, and then click the Cells Inspector button.
- 3 Choose Number from the Cell Format pop-up menu.
- 4 To specify how many decimal places to display, use the Decimals field. If a value contains more decimal places than you specify, the decimal value displayed is rounded, not truncated. For example, if a cell is formatted to display two decimal places, the value 3.456 is displayed as 3.46, not 3.45.
- 5 To specify how to display negative values, choose an entry from the pop-up menu adjacent to the Decimals field.
- 6 To specify whether to use a thousands separator, select Thousands Separator.

## Using the Currency Format

Use the currency format to format the display of monetary values.

To define a currency format that displays two decimal places, a thousands separator, and negative numbers with the negative symbol, select one or more cells and then click the Currency Format button in the Format Bar. Use the Decrease Decimal Places and Increase Decimal Places buttons located nearby to change the number of decimal places.



For more control over the currency format, use the Cells Inspector.

### To define a currency format using the Cells Inspector:

- 1 Select the cell or cells.
- 2 Click Inspector in the toolbar, and then click the Cells Inspector button.
- 3 Choose Currency from the Cell Format pop-up menu.
- 4 To specify a currency symbol, choose an option from the Symbol pop-up menu.  
You can maximize the number of options in the Symbol pop-up menu by choosing Numbers > Preferences and selecting "Show complete list of currencies in Cell Inspector" in the General pane.
- 5 To specify how many decimal places to display, use the Decimals field. If a value contains more decimal places than you specify, the decimal value displayed is rounded, not truncated. For example, if a cell is formatted to display two decimal places, the value 3.456 is displayed as 3.46, not 3.45.
- 6 To specify how to display negative values, choose an entry from the pop-up menu adjacent to the Decimals field.
- 7 To specify whether to use a thousands separator, select Thousands Separator.
- 8 To display the currency symbol at the edge of the cell, select Accounting Style.

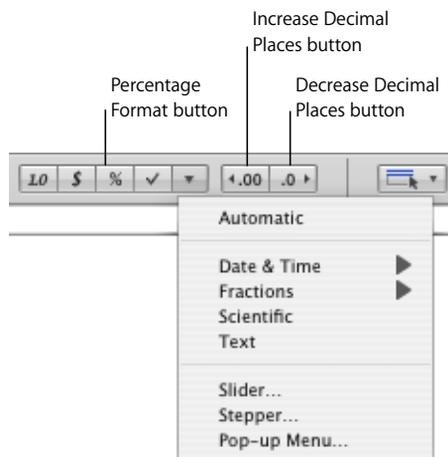
## Using the Percentage Format

Use the percentage format to display numeric values followed by the % symbol.

If the value is used in a formula, its decimal number version is used. For example, a value that displays as 3% is used as 0.03 in a formula.

If you type 3% in a cell formatted using the automatic format and then apply the percentage format to the cell, the value displayed is 3%. However, if you type 3 in a cell formatted using the automatic format and then apply the percentage format to the cell, the value displayed is 300%.

To define a percentage format that displays two decimal places, a thousands separator, and negative numbers with the negative symbol, select one or more cells and then click the Percentage Format button in the Format Bar. Use the Decrease Decimal Places and Increase Decimal Places buttons located nearby to change the number of decimal places.



For more control over the percentage format, use the Cells Inspector.

### To define a percentage format using the Cells Inspector:

- 1 Select the cell or cells.
- 2 Click Inspector in the toolbar, and then click the Cells Inspector button.
- 3 Choose Percentage from the Cell Format pop-up menu.
- 4 To specify how many decimal places to display, use the Decimals field. If a value contains more decimal places than you specify, the decimal value displayed is rounded, not truncated. For example, if a cell is formatted to display two decimal places, the value 3.456 is displayed as 3.46, not 3.45.

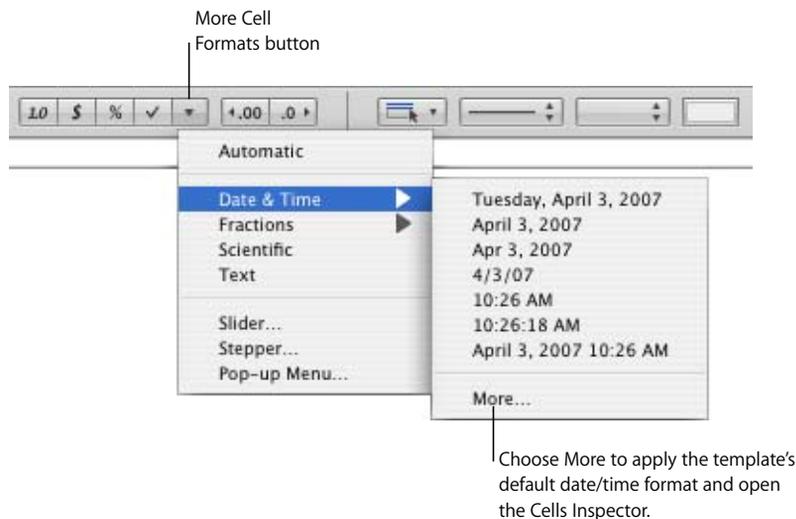
- 5 To specify how to display negative values, choose an entry from the pop-up menu adjacent to the Decimals field.
- 6 To specify whether to use a thousands separator, select Thousands Separator.

If a cell you're formatting already contains a value, the value is assumed to be a decimal value, and it's converted into a percentage. For example, 3 becomes 300%.

### Using the Date and Time Format

Use the date and time format to display date and/or time values.

To define a date and time format, click the More Cell Formats button in the Format Bar, select one or more cells, choose Date & Time from the pop-up menu, and then choose an option from the submenu.



For more control over the date and time format, use the Cells Inspector.

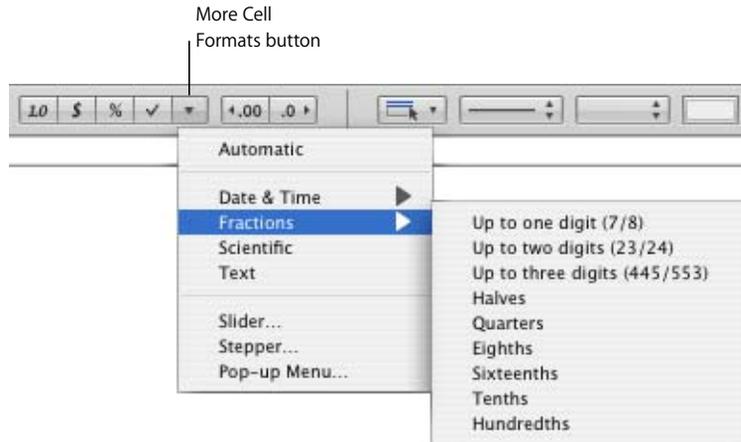
#### To define a date and time format using the Cells Inspector:

- 1 Select the cell or cells.
- 2 Click Inspector in the toolbar, and then click the Cells Inspector button.
- 3 Choose Date and Time from the Cell Format pop-up menu.
- 4 To specify how you want a date formatted, choose a format from the Date pop-up menu.
- 5 To specify how you want a time value formatted, choose a format from the Time pop-up menu.

## Using the Fraction Format

Use the fraction format to control the display of values smaller than 1. For example, 27.5 displays as 27 1/2 when the format is Halves and as 27 4/8 when the format is Eighths.

To define a fractions format, select one or more cells, choose Fractions from the More Cell Formats pop-up menu in the Format Bar, and choose a format from the submenu.



You can also use the Cells Inspector.

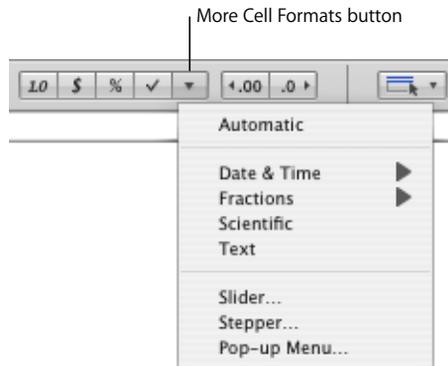
### To define a fraction format for selected cells using the Cells Inspector:

- 1 Select the cell or cells.
- 2 Click Inspector in the toolbar, and then click the Cells Inspector button.
- 3 Choose Fraction from the Cell Format pop-up menu.
- 4 Choose a display format from the Accuracy pop-up menu.

## Using the Scientific Format

Use the scientific format to display numbers using an exponent raised by the power of 10. The exponent is displayed following an "E." For example, the value 5.00 in scientific format displays as 5.00E0. And the value 12345 displays as 1.2345E4.

To define a scientific format that displays two decimal places, select one or more cells and then choose Scientific from the More Cell Formats button in the Format Bar.



For more control over the number of decimal places, use the Cells Inspector.

**To define a scientific format for one or more cells using the Cells Inspector:**

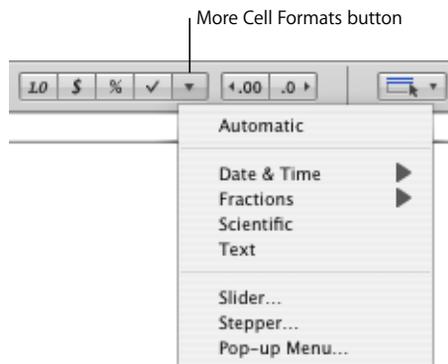
- 1 Select the cell or cells.
- 2 Click Inspector in the toolbar, and then click the Cells Inspector button.
- 3 Choose Scientific from the Cell Format pop-up menu.
- 4 Use the Decimals field to specify the number of decimal places to display.

### Using the Text Format

Use the text format when you want all of a cell's content to be treated as text, even when it's a number.

**Here are ways to define a text format for one or more selected cells:**

- Click the More Cell Formats button in the Format Bar and then choose Text.



- Click Inspector in the toolbar, click the Cells Inspector button, and choose Text from the Cell Format pop-up menu.

## Using a Checkbox and Other Control Formats

You can add a checkbox, slider, stepper, or pop-up menu to a cell:

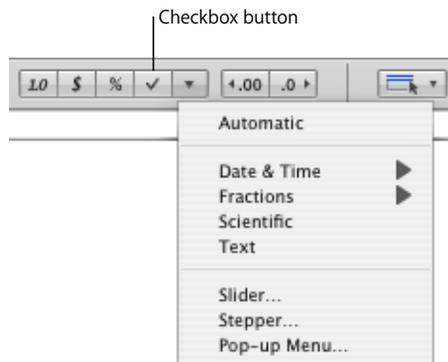
- A *checkbox* is for cells whose value indicates one of two states, such as *on* or *off*, or *yes* or *no*.
- A *slider* is useful for quickly making large changes to numbers so you can see the effects of the changes on other cells in the table or on a chart.
- A *stepper* lets you increase or decrease numbers in specific increments.
- A *pop-up menu* lets you predefine the values a cell can contain.

When a cell is formatted to use a checkbox or pop-up menu, you can add or change a cell's content only by using the control. Cells that use a slider or stepper let you type a value into the cell or use the control; when you click off the cell, the value changes depending on the settings you make when you define the slider and stepper.

### Here are ways to add controls to cells:

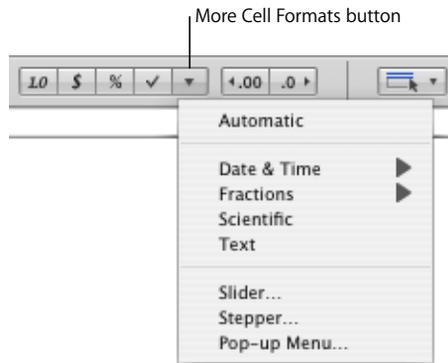
- To add a checkbox, select the cell or cells.

Click the Checkbox button in the Format Bar. Unchecked checkboxes are added to selected cells.



You can also click Inspector in the toolbar, and then click the Cells Inspector button. Choose Checkbox from the Cell Format pop-up menu, and then select the initial State (Checked or Unchecked).

- To add a slider, click the More Cell Formats button in the Format Bar and then choose Slider in the pop-up menu. A slider with default settings, visible in the Cells Inspector, is created.



You can also open the Cells Inspector and choose Slider from the Cell Format pop-up menu.

In the Cells Inspector, change default settings if desired:

*Minimum* and *Maximum*: Indicates the lowest and highest cell values.

*Increment*: Indicates the amount by which the cell value increases or decreases when you move the slider (or arrow keys) one increment.

*Position*: Lets you locate the slider to the right of the cell or at the bottom of the cell.

*Display as*: Applies a number, currency, percentage, or scientific format to the cell values.

*Decimals*: Indicates how many decimal places to display.

- To add a pop-up menu, click the More Cell Formats button in the Format Bar and then choose Pop-up Menu in the pop-up menu to create a pop-up menu with default settings.

You can also open the Cells Inspector and choose Pop-up Menu from the Cell Format pop-up menu.

In the Cells Inspector, edit the placeholder entries in the list by selecting them and typing values of your choice.

To add an item to the list, click + and type the item. If you specify a number, it's treated as a number, not as text.

To remove an item, select it and click –.

- To add a stepper, click the More Cell Formats button in the Format Bar and then choose Stepper in the pop-up menu to create a stepper with default settings.

You can also open the Cells Inspector and choose Stepper from the Cell Format pop-up menu.

In the Cells Inspector, change the default settings if desired:

*Minimum and Maximum:* Indicates the lowest and highest cell values.

*Increment:* Indicates the amount by which the cell value increases or decreases when you click the stepper control (or an arrow key) once.

*Display as:* Applies a number, currency, percentage, or scientific format to the cell values.

*Decimals:* Indicates how many decimal places to display.

## Monitoring Cell Values

You can have Numbers change a cell's fill and/or text color when its content exhibits a particular condition.

You define simple rules that test for the condition and then change fill and/or text color if the condition is met. For example, you can define a rule that turns a cell blue if it contains a particular value and another rule that turns the cell green if it contains another value.

You can apply a rule to a single cell or to a range of cells. Rules applied to multiple cells trigger color changes when *any* of the cells meet the rule's condition.

### To define rules:

- 1 Select one or more cells.
- 2 Click Inspector in the toolbar and click the Cells Inspector button.
- 3 Select Conditional Format, and then click "Show rules."
- 4 Select "Highlight cells using the following rules."
- 5 Choose a condition from the "Choose a rule" pop-up menu.

The conditions in the top section of the menu apply tests to numeric values. Conditions for text values are in the middle section of the list, and date conditions are at the bottom.

Note that the Between condition requires that you specify two numbers. The condition is met if either of the numbers or any number in between them appears in the cell(s).

- 6 Provide additional information as required to fully specify a particular condition to test for.
- 7 Select Fill Color and/or Text Color and click the color wells (see "Using the Colors Window" on page 161) to define the background and value colors to apply to the cell if the condition is met.

- 8 To add another rule, click + and repeat steps 5 through 7.

If more than one rule is defined for a cell and the cell's content satisfies the conditions of multiple rules, the colors associated with the higher rule in the list of rules are applied to the cell.

To stop using a rule, click its – button to delete the rule, or deselect Fill Color and Text Color to disable the rule. To stop using a list of rules, deselect “Highlight cells using the following rules.”

## Adding Images or Color to Cells

You can add graphics or color to individual table cells or to an entire table.

### To add an image or color to a table cell:

- 1 Select the cell.
- 2 Click Inspector in the toolbar, and then click the Table Inspector.
- 3 To add an image, choose Image Fill from the Cell Background pop-up menu. See “Filling an Object with an Image” on page 162 for instructions.
- 4 To add background color, choose Color Fill or Gradient Fill from the Cell Background pop-up menu. See “Filling an Object with Color” on page 160 for more information.

## Autofilling Table Cells

Autofilling lets you use the content in one or more cells to automatically add values to adjacent cells.

### Here are ways to autofill table cells:

- To paste the content and fill of a cell into adjacent cells, select the cell and then drag the Fill handle in its lower right corner over the cells into which you want to paste. Any data, cell format, formula, or fill associated with the selected cell is pasted, but comments aren't pasted. If any target cell contains data, autofilling overwrites that data with the value you're repeating.
- To paste the content and fill of a cell into one or more cells in the same row or column, select two or more adjacent cells. Choose Insert > Fill Right to assign selected cells the value that resides in the leftmost selected cell(s). Choose Insert > Fill Down to assign selected cells the value that resides in the topmost selected cell(s). Any data, cell format, formula, or fill associated with the selected cell is pasted, but comments aren't pasted. If any target cell contains data, autofilling overwrites that data with the value you're repeating.
- You can also add values to cells based on value patterns. For example, if a cell contains a day of the week or a month, you can select the cell and then drag to the right or down to add the next day of the week or month to the adjacent cell.

To create new values based on numeric patterns, select two or more cells before dragging. For example, if two selected cells contain 1 and 2, the values 3 and 4 are added when you drag through the adjacent two cells. And if two selected cells contain 1 and 4, the values 7 and 10 are added when you drag through the adjacent two cells (values are incremented by 3).

Autofilling doesn't set up an ongoing relationship among cells in the group. After autofilling, you can change the cells independently of each other.

## Working with Rows and Columns

You can quickly add or remove rows and columns, create a header row or column or a footer row, and more.

When you insert, remove, resize, hide, or show rows or columns in a table, other objects on the sheet may be moved to avoid overlapping or to maintain relative object positions. To prevent automatic movement of objects, choose Numbers > Preferences and in the General pane deselect "Automatically move objects when tables resize."

### Adding Rows

You can add rows within a table or at the end of a table.

If the table contains a footer row, rows added at the bottom of the table are added above the footer row. If the table has filtering criteria associated with it, you can't add new rows until you stop filtering rows; see "Filtering Rows" on page 78 for instructions.

#### Here are ways to add rows:

- To add a single row, hover your pointer over a row's reference tab to see its menu arrow, and then click the arrow and choose Add Row Above or Add Row Below from the pop-up menu. You can also choose these commands from the Table menu.
- To add a row at the end of the table, press Return when the last cell is selected. Press Return twice if you've just added or changed the cell value.

If "Return key moves to next cell" under Table Options in the Table Inspector isn't selected, press Tab instead from the last cell in the row.

- To add one or more rows at the end of the table, you can use the Row handle in the lower left, visible when a cell is selected.

To add a row at the end of the table, click the Row handle once.

To add multiple rows at the end of the table, drag the Row handle or the Column and Row handle (in the lower right) down.

To add rows and columns at the same time, drag the Column and Row handle diagonally.

- You can split cells into two equal rows. "Splitting Table Cells" on page 74 tells you how.

## Adding Columns

You can add new columns to a table.

### Here are ways to add columns:

- To add a single column, hover your pointer over a column's reference tab to see its menu arrow. Click the arrow and then choose Add Column Before or Add Column After from the pop-up menu. You can also choose these commands from the Table menu.
- You can use the Tab key to add a column to the right side of the table when "Return key moves to next cell" under Table Options in the Table Inspector is selected.  
Press Tab once when the last cell is selected. Press Tab twice if you've just added or changed the cell value.

- To add one or more columns to the right side of a table, you can use the Column handle in the upper right, visible when a cell is selected.

To add a column to the right side of the table, click the Column handle once.

To add multiple columns to the right side of the table, drag the Column handle or the Column and Row handle (in the lower right) to the right.

To add rows and columns at the same time, drag the Column and Row handle diagonally.

- You can split cells into two equal columns. "Splitting Table Cells" on page 74 tells you how.

## Rearranging Rows and Columns

Using a row's or column's reference tab, you can move or copy the row or column to a different location in the same table or another table.

### Here are ways to rearrange rows and columns:

- To move a column or row to a different location in the same table or a different table, click the column or row reference tab, and then click and drag the reference tab. Release the tab when the bold line highlights where you want to insert the column or row.
- To insert a copy of a row or column elsewhere in the table or in another table, click the reference tab, click again, and hold down the Option key and the reference tab while you drag the column or row to the desired location.

You can also copy or move a single cell or a group of adjacent cells within or between tables. See "Copying and Moving Cells" for instructions.

## Deleting Table Rows and Columns

There are several techniques available for deleting one or more rows or columns of a table.

**Here are ways to delete rows or columns:**

- Select the row(s) or column(s) or a cell in them, and then choose Table > Delete Row or Table > Delete Column.
- To delete a single row or column, hover your pointer over the row or column reference tab to see the menu arrow, and then choose Delete Row or Delete Column from the pop-up menu.
- To delete several adjacent rows or columns, select the rows or columns and choose Delete Selected Rows or Delete Selected Columns from the pop-up menu of a selected row's or column's reference tab.
- Drag the Row handle in the lower left or the Column handle in the lower right up to delete empty rows.

To remove rows with content, hold down the Option key while dragging.

- Drag the Column handle in the upper right inward to delete empty columns.

To remove columns with content, hold down the Option key while dragging.

### Using a Table Header Row or Column

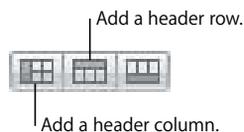
Use header rows and columns to label the data in rows and columns. Header rows and columns are formatted so that they stand out from the other rows and columns. A header row consists of the topmost cell in each column. A header column consists of the leftmost cell in each row.

Header rows and header columns appear at the beginning of the table and on each page if the table spans more than one page. If a table spans multiple pages, editing the text or changing the look of the header row or column in one place changes it consistently throughout the table.

You can't split a header row or footer row into multiple rows or header columns into multiple columns.

**Here are ways to add or delete a header row or column:**

- Select the table and then click the appropriate Header button in the Format Bar.



If the table has no header row or column, one is added. If the table has a header row or column, it's deleted.

- Select the table. Click Inspector in the toolbar, click the Table Inspector button, and then click the appropriate Headers & Footer button.

- Select the table and then choose one of the following from the Table menu: Add Header Row, Delete Header Row, Add Header Column, or Delete Header Column.
- If a table spans pages and you want to repeat headers at the top of each page, select “Repeat header cells on each page” in the Table Options area of the Table Inspector.

The cells in a header row or header column are referred to as *header cells*. Header cells play an important role in making formulas in table cells easier to read and create. See “Using Cell References” on page 91 and “Applying a Formula Once to Cells in a Column or Row” on page 93 to learn more.

## Using a Footer Row

Use a footer row when you want to draw attention to the last row in a table. A footer row can contain the same content as any other row, but its formatting makes it visually prominent.

**Here are ways to add or delete a footer row:**

- Select the table and then click the Footer button in the Format Bar.



If the table has no footer row, one is added. If the table has a footer row, it’s deleted.

- Select the table. Click Inspector in the toolbar, click the Table Inspector button, and then click the appropriate Headers & Footer button.

If the table has no footer row, one is added. If the table has a footer row, it’s deleted.

- Select the table and then choose Add Footer Row or Delete Footer Row from the Table menu.

## Hiding Rows and Columns

Hide specific rows or columns when you want to avoid showing or using them but don’t want to delete them. While a row or column is hidden, it can’t be reformatted, merged, split, or otherwise manipulated. However, any formula that uses a hidden cell isn’t affected, and sorting takes hidden values into account.

**To hide a row or column:**

- Choose Hide Row or Hide Column from a row or column reference tab’s pop-up menu.

To show hidden rows and columns, choose Table > Unhide All Rows or Table > Unhide All Columns.

Rows or columns that are hidden in Numbers tables aren’t visible when the tables are copied into other iWork ’08 applications. To see the hidden rows, select the table and choose Format > Table > Unhide All Rows or Unhide All Columns.

## Resizing Table Rows and Columns

Resize all rows and columns so they're equal in size, or resize only specific rows and columns in a table.

### Here are ways to resize rows and columns:

- To make all rows the same size, select the table and choose Table > Distribute Rows Evenly.
- To make all columns the same size, choose Table > Distribute Columns Evenly.
- To resize a single row, drag the bottom border of the row's reference tab up or down. You can also select the row and use the Row Height field in the Table Inspector.
- To resize one column, drag the right border of the column's reference tab right or left. You can also select a cell and use the Column Width field in the Table Inspector.
- To make several rows the same size, select one or more cells in the rows and choose Table > Distribute Rows Evenly. The rows don't have to be adjacent. You can also drag the bottom border of the reference tab of one of the rows up or down or use the Row Height field in the Table Inspector.
- To make several columns the same size, select one or more cells in the columns and choose Table > Distribute Columns Evenly. The columns don't have to be adjacent. You can also drag the right border of the reference tab of one of the columns left or right or use the Column Width field in the Table Inspector.
- To shrink a row or column in order to remove unused space when cell values don't fill their cells, select a cell and click one of the Fit buttons in the Table Inspector.

If cell content is clipped as a result of resizing, see "Displaying Content Too Large for Its Cell" on page 57 for options.

## Alternating Row Colors

Use a different color background for alternate rows to give a table a banded effect.

### To alternate row colors:

- 1 Select the table.
- 2 Click Inspector in the toolbar and then click the Table Inspector button.
- 3 Select Alternating Row Color.
- 4 Click the adjacent color well to open the Colors Window, and then choose a color for the alternate rows. See "Using the Colors Window" on page 161 for instructions.
- 5 To change the fill attributes of the other rows, use the Cell Background controls in the Table Inspector. See "Filling an Object with Color" on page 160 for instructions.

## Working with Table Cells

You can split and merge table cells, resize them, format them, hide them, add comments, and more.

### Merging Table Cells

Merging table cells combines adjacent cells into one, eliminating the borders so that they behave as a single cell.

#### To merge table cells:

- 1 Select a group of two or more adjacent table cells. The group of cells you choose must form a rectangle, and they must be all body cells or all header cells.
- 2 Choose Table > Merge Cells.

You can also click the Merge button in the Table Inspector.

Merging horizontally contiguous cells containing only text or a mixture of text, numbers, formatted values, and formulas joins the content from all the original cells as text separated by tabs. Merging vertically contiguous cells containing only text or a mixture of text, numbers, formatted values, and formulas joins the content from all the cells as text separated by carriage returns.

When you merge column cells, the cell background takes on the image or color that was in the topmost cell. When you merge row cells, the cell background takes on the image or color that was in the leftmost cell.

When a cell containing text, a number, a formula, or a cell format is merged with an empty cell, the new cell retains the content of the non-empty cell.

When a cell containing a number format is merged with an empty cell, the new cell retains the number format.

### Splitting Table Cells

Splitting cells divides each selected cell into two equal parts, horizontally (rows) or vertically (columns). Both of the new cells have identical background colors or images. Any text that was in the original cell remains in the topmost or leftmost cell.

#### To split cells horizontally or vertically:

- 1 Select a table cell or cells. To split an entire row or column, select all the cells in the row or column.
- 2 To split cells into rows, choose Table > Split into Rows. To split cells into columns, choose Table > Split into Columns.

You can also click the Split button in the Table Inspector.

- 3 To create smaller and smaller units, repeat steps 1 and 2 for the split cells.

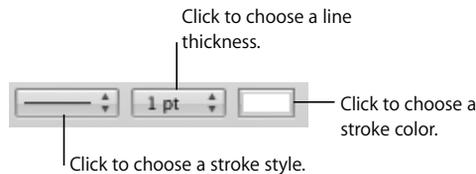
To rejoin split cells, merge them as “Merging Table Cells” on page 74 describes.

## Formatting Table Cell Borders

You can change the line thickness and color of table cell borders. Or you can hide the cell border of any cell.

### To format table cell borders:

- 1 Select the cell border segments you want to format. See “Selecting Table Cell Borders” on page 53 for instructions.
- 2 Use the controls in the Format Bar or in the Table Inspector.



*Stroke pop-up menu:* Lets you choose a stroke style. Choose None to hide borders.

*Line thickness:* Controls the thickness of the stroke.

*Color well:* Lets you choose a stroke color.

When you click the color well in the Format Bar, a color matrix appears. Select a color by clicking it in the matrix, or click Show Colors to open the Colors window for additional color options.



When you click the color well in the Table Inspector, the Colors window opens. “Using the Colors Window” on page 161 provides instructions for using this tool.

## Copying and Moving Cells

You can use commands or dragging to move or copy table cells.

### Here are ways to copy and move cells:

- To move cells within a table or to another table, select a cell or several adjacent cells, and then drag the selection by its border until the destination cells are selected. Any values in the destination cells are replaced.
- To copy cells within or between tables, drag selected cells while holding down the Option key. Any values in the destination cells are replaced.

You can also copy cells by selecting them, choosing Edit > Copy, selecting destination cells, and then choosing Edit > Paste.

You can also paste a cell's content into *multiple* cells, which don't have to be adjacent to the copied cell or to each other. After copying a cell, select the destination cells and choose Edit > Paste. The cell's contents are copied to all the destination cells, in the same or another table, replacing any existing content.

- To insert copied cells without overwriting destination cells, choose Insert > Copied Columns or Insert > Copied Rows after selecting destination cells.

*Copied Columns:* Adds new columns to accommodate copied cells.

*Copied Rows:* Adds new rows to accommodate copied cells.

When a cell value is replaced, so is any comment associated with the cell.

See "Rearranging Rows and Columns" on page 70 to learn how to copy and move rows and columns using the reference tabs.

See "Copying or Moving Formulas with Cell References" on page 92 to learn about techniques for duplicating or moving a cell that contains a formula.

## Adding Comments

Use comments to record information about table cells.

### Here are ways to work with comments:

- To add a comment to a cell, select the cell and click Comment in the toolbar. Type in the comment box.
- To move a comment, drag it.
- To hide all comments, choose View > Hide Comments. A yellow marker appears in any table cell containing a comment.

To hide one comment, click the "-" in the upper right of the comment box.

- To show a hidden comment, click its marker.

To show all comments, choose View > Show Comments.

- To delete a comment, click the X in the upper right of the comment box.
- To include comments when you print a sheet, show any comments you want to print, and then choose File > Print Sheet.

## Reorganizing Tables

You can use sorting and filtering to reorganize the data in tables.

- *Sorting*: Lets you arrange values in some or all the cells in a column in ascending or descending order. Rows containing cells being sorted are reordered.
- *Filtering*: Lets you hide rows in a table that don't contain the values you specify.

### Sorting Table Cells

You can arrange values in some or all the cells in a column in ascending or descending order. Rows containing cells being sorted are reordered. Header cells aren't sorted.

Sorting takes into account values in hidden rows and hidden columns.

#### Here are ways to sort:

- To sort all the cells in a column, choose Sort Ascending or Sort Descending from the pop-up menu for the column's reference tab.  
You can also click Sort & Filter in the toolbar or choose Show Sort & Filter Panel from a reference tab's pop-up menu. Use the pop-up menus under Sort to choose a column and sort order.
- To re-sort values after changing them, click Refresh in the Sort & Filter panel.
- To sort only some of the cells in a column, select the cells, open the Sort & Filter panel, choose a sort order, and then click Refresh.
- To sort all the cells in a column and then re-sort the results using another column's values, open the Sort & Filter panel, choose a column and sort order in the Sort pop-up menus, click +, choose another column and sort order, and then click Refresh.

To use additional sort criteria, click + to define each one you want to add.

The following table describes how different types of data are sorted in ascending or descending order.

Type of data	Ascending order	Descending order
Text	aA–zZ	Zz–Aa
Dates	Year (earliest first), then Month (January first), then day (1–31)	Year (most current first), then month (December first), then day (31–1)
Numbers	–2, –1, 0, 1, and so on	1, 0, –1, –2, and so on
Cells containing only text, mixed with cells containing only numbers	–2, –1, 0, 1, and so on, then aA–zZ	Zz–Aa, then 1, 0, –1, –2, and so on
Cells containing a mixture of text and numbers	Values starting with numbers first (1z, 1Z, a1, A1)	Values starting with text first (A1, a1, 1A, 1z)
Empty cells	At the bottom	At the bottom
Boolean (TRUE, FALSE)	Below text and above an empty cell	Above text

## Filtering Rows

You can hide rows in a table that don't contain the values you specify.

### To specify criteria for rows you want to show:

- 1 Select the table.
- 2 Click Sort & Filter in the toolbar or choose Show Sort & Filter Panel from a reference tab's pop-up menu.
- 3 Select "Show rows that match the following," and then choose the column whose values you want to use to create filter criteria.
- 4 Use the remaining controls to define the column value for rows you want to show.
- 5 To use additional filter criteria, click + to define each one you want to add.

If you choose "is in the top  $n$  values" or "is in the bottom  $n$  values," all values matching the top or bottom  $n$  will be shown, which may be more than  $n$ .

**Note:** You can't add any new rows to the table until you stop filtering rows. To stop filtering rows in the table, deselect "Show rows that match the following."

When you sort table cells, values in hidden rows are taken into account.

This chapter explains how to use table styles to quickly and consistently manage the appearance of tables.

You can use different visual characteristics to distinguish different tables in your Numbers spreadsheet. For example, you can format a table containing inputs and assumptions using a blue background and matching borders, but format a table containing calculation results using a gray background and matching borders.

The simplest way to change the appearance of a table is to apply a table style to it. Table styles also ensure that tables are consistently formatted.

The Numbers templates include a variety of table styles that are ready to use. You can also modify the template styles or create your own styles.

## Using Table Styles

A table style is predefined formatting that you can apply to a table with the click of a mouse.

A table style predefines the following attributes:

- The table background (color or image) and its opacity
- The stroke, color, and opacity of the outside border of body cells, and the outside borders of the header row, header column, and footer row.
- The background (color or image and opacity) and the text attributes of table cells, including header and footer cells

## Applying Table Styles

After applying a table style to a table, you can change any of the formatting defined by the style. Such a change is called an *override*. If you later assign a different style to the table, you can keep or remove any overrides you created.

### Here are ways to apply a table style:

- To replace a table's existing style and remove any overrides, click the arrow to the right of the style you want to apply and then choose Clear and Apply Style.

You can also choose Format > Reapply Table Style.

- To replace a table's existing style but keep any overrides, select the table and then click the name of a style in the Styles pane at the left of the window. You can also select a table, click the arrow to the right of the style you want to apply, and then choose Apply Style.

You can also drag a style name from the Styles pane to a table. The table doesn't need to be selected in this case.

- To replace the style of all tables in a sheet but keep any overrides, drag a style name from the Styles pane to a sheet icon in the Sheets pane.

## Modifying a Table's Style

Most of the time you change the appearance of a table by applying a different table style. You can also redefine attributes of the style assigned to the table or use a copy/paste style operation to modify a table's style.

### Modifying Table Style Attributes

You can change a table's appearance by modifying the attributes of the table's style.

#### Here are ways to modify table style attributes:

- To change the background color of a table, header cells, or body cells, select the table or cells and click the Fill well in the Format Bar.

You can use the Cell Background controls in the Table Inspector to make more extensive changes to the selection. "Filling an Object with an Image" on page 162 and "Filling an Object with Color" on page 160 provide instructions for these controls.

To change the opacity of the background, use the Opacity controls in the Graphic Inspector. See "Adjusting Opacity" on page 158 for instructions.

- To change the stroke and color of table cell borders, follow the instructions in "Formatting Table Cell Borders" on page 75.

- To format text in one or more cells, select the cells.

To modify the color, alignment, and spacing of text within a cell, use the Format Bar or the Text Inspector (click Inspector in the toolbar and click the Text Inspector button).

To modify font attributes, use the Font panel (click Fonts in the toolbar).

If you want to use the changes you make to redefine the table style for the whole spreadsheet, click the arrow to the right of the style and then choose Redefine Style from Table. All tables in the spreadsheet that use the style are updated to reflect the changes you made, but overrides are maintained.

You can also create a new style using the changes you've made by clicking the arrow to the right of the style and then choosing Create New Style.

## Copying and Pasting Table Styles

You can change a table's appearance by copying and pasting table and table cell styles.

**Here are ways to copy and paste table styles:**

- To copy a cell's style, select the cell and choose Format > Copy Style.
- To apply a copied cell style to other cells, select the cells and choose Format > Paste Style.
- To paste a copied table using the spreadsheet's default table style, choose Edit > Paste and Match Style.

## Using the Default Table Style

Every spreadsheet has a table style that's designated as the *default table style*. It's the table style that's applied to new tables.

**To change the default table style:**

- Click the arrow to the right of the style you want to use as the default table style and then choose Set as Default Style for New Tables.

To use the default table style for a reusable table you define, follow the instructions in "Defining Reusable Tables" on page 49.

## Creating New Table Styles

You can create a new table style by reformatting a table and saving the formatting as a table style.

### To create a new table style:

- 1 Use the instructions in “Modifying Table Style Attributes” on page 80 to achieve the visual effects you want.
- 2 Select the table, click the arrow to the right of any style in the Styles pane, and then choose Create New Style.
- 3 Type a unique name for your new table style, and click OK.

The new table style now appears in the Styles pane and can be applied to any table in your spreadsheet.

To make a new table style available in other spreadsheets, create a template from the spreadsheet. See “Designing a Template” on page 188 for details.

## Renaming a Table Style

You can change the name of a table style.

### To rename a table style:

- 1 Click the arrow to the right of the style in the Styles pane.
- 2 Choose Rename Style.
- 3 Edit the style name, making sure it’s unique in the spreadsheet.
- 4 Press Return.

## Deleting a Table Style

When you delete a table style that’s used in a spreadsheet, you need to choose a different style to replace it.

### To delete a style:

- 1 Click the arrow to the right of the style in the Styles pane.
- 2 Choose Delete Style.
- 3 If the style you want to delete is being used in the current spreadsheet, choose a style to replace it and then click OK.

This chapter tells you how to perform calculations in table cells using formulas and functions.

See Chapter 3, “Using Tables,” on page 44 for instructions for adding and formatting tables and data in them and Chapter 12, “Dictionary of Functions,” on page 193 for complete information about individual functions.

## Using Formulas

A formula is a mathematical expression that uses operations to derive a value. You can add a formula to a table cell to display a value derived from values in other table cells.

For example, you can add a formula to the bottom cell of a column that adds the numbers in all the other cells in the column. If any of the column values change, the total in the bottom cell changes automatically.

Formulas derive values by using operators and functions.

- *Operators* perform operations such as addition (+) and multiplication (\*).

Here’s a formula that adds values: `=A2 + 16`. `A2` is called a *cell reference*; `A2` refers to the second cell in the first column. The value `16` is called a *constant*, because it’s a specific value that uses no operators or functions.

The value in cell `A2` is added to the value `16`, and the result is displayed in the cell that contains the formula.

Formulas always begin with an equal sign (=). For simplicity, the examples throughout the Numbers documentation omit the equal sign.

- *Functions* are predefined, named operations, such as `SUM` and `AVERAGE`.

To use a function, you name the function and, in parentheses following the name, you provide the arguments it needs. *Arguments* specify the data the function will use when it performs its operations.

Here's a formula that adds the values in nine cells of the first column: SUM(A2:A10). There is one argument, A2:A10. The colon means the function should use the values in cells A2 through A10.

You don't need to understand more than this to use formulas in tables. Templates (such as the Loan Comparison and Mortgage templates) and formula editing tools (such as the Formula Editor and the Formula Bar) make basic formulas easy to use.

## A Tour of Using Formulas

Reviewing the formulas built into the Invoice template is a good introduction to Numbers formulas.

- 1 Create a new Numbers spreadsheet using the Invoice template.

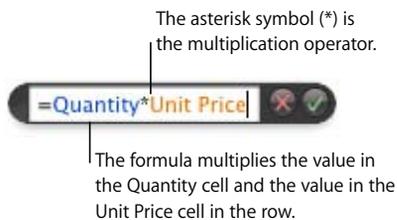
Open Numbers, in the Template Chooser click Business, select Invoice, and then click Choose.

The Invoice table in this template uses formulas to derive the values in the Cost column.

Description	Quantity	Unit Price	Cost
			\$0.00
			\$0.00
			\$0.00
			\$0.00
			\$0.00
			\$0.00
			\$0.00
			\$0.00
		Subtotal	\$0.00
	Tax	8.25%	\$0.00
		Total	\$0.00

A formula in each cell of the Cost column updates Cost values when values in other cells change.

- 2 Double-click the topmost dollar value in the Cost column. The Formula Editor opens, revealing that the value is derived using a formula.



Header row names (Quantity and Unit Price) are used in the formula to refer to two cells. Using header text to refer to cells makes formulas more readable. But you can also use the letters and numbers in the reference tabs to refer to cells, as you'll see in step 4.

- 3 If the value in a Quantity cell or in a Unit Price cell changes, the formula associated with the Cost cell updates the value it displays. To see this happen, type a value in the Quantity and Unit Price cells in any row and notice how the value in the adjacent Cost cell is updated.
- 4 Double-click the cell in the Cost column that's in the row containing *Subtotal*. In this formula, two cells are identified by using reference tab identifiers. When you use reference tab identifiers to identify a cell in a formula, you first specify the column letter and then you specify the row number.

Columns are referenced alphabetically.

	A	B	C	D
1	Description	Quantity	Unit Price	Cost
2				\$0.00
3				\$0.00
4				\$0.00
5				\$0.00
6				\$0.00
7				\$0.00
8				\$0.00
9				\$0.00
10			Subtotal	=SUM(D2:D9)
11		Tax	8.25%	\$0.00
12			Total	\$0.00

Rows are referenced numerically.

Cell D2 is the cell at the intersection of column D and row 2.

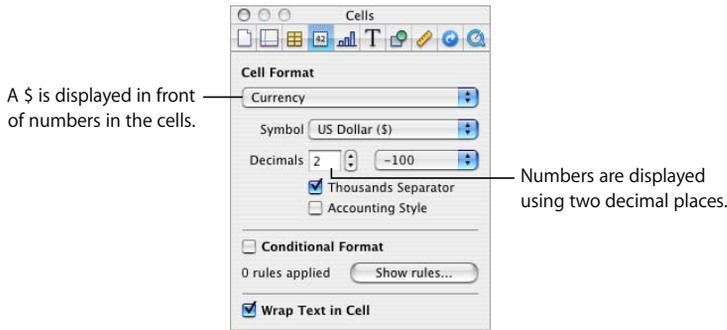
The notation used to refer to a cell in a formula is called a *cell reference*. As you've seen, a cell reference can be created by using header text or by using a reference tab identifier.

- 5 The Subtotal formula uses a function named SUM.

`=SUM(D2:D9)`

A function is a predefined operation. The SUM function adds the values you specify within the parentheses. In this example, the SUM function adds the values in cells D2 through D9. The colon (:) is a shorthand way of referring to a range of cells.

- The values in the Cost column are formatted for display using a cell format (currency). To see the cell format settings, close the Formula Editor by clicking outside the table. Then click the table, click any cell in the Cost column, click Inspector in the toolbar, and then click the Cells Inspector button.



See “Formatting Cell Values” on page 58 for more information about options for displaying values in table cells.

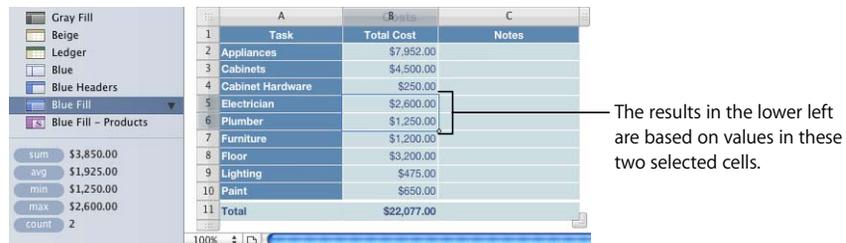
## Performing Instant Calculations

In the lower left of the Numbers window, you can view the results of common calculations using values in two or more selected table cells.

**To perform instant calculations:**

- Select two or more cells in a table. They don’t have to be adjacent.

The results of calculations using the values in those cells are instantly displayed in the lower left.



*sum*: The sum of numeric values in selected cells.

*avg*: The average of numeric values in selected cells.

*min*: The smallest numeric value in selected cells.

*max*: The largest numeric value in selected cells

*count*: The number of numeric values and date/time values in selected cells.

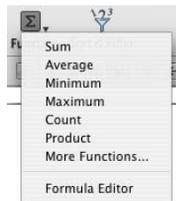
Empty cells and cells that contain other kinds of values aren’t used in the calculations.

- 2 To perform another set of instant calculations, select different cells.

If you find a particular calculation very useful and you want to incorporate it into a table, you can add it as a formula to an empty table cell. Simply drag sum, avg, or one of the other items in the lower left to an empty cell. The cell doesn't have to be in the same table as the cells used in the calculations.

### Adding a Quick Formula

An easy way to perform a basic calculation using values in a range of adjacent table cells is to add a quick formula using the pop-up menu visible when you click Function in the toolbar.



You can also choose Insert > Function and use the submenu that appears.

**Here are operations you can perform using the pop-up menu or submenu:**

- Choose one of the following to perform calculations using values in the selected cells. Empty cells and cells containing values that aren't mentioned are ignored.

*Sum:* Totals numeric values in the cells.

*Average:* Calculates the arithmetic mean of numeric values in the cells.

*Minimum:* Determines which numeric value in the cells is the smallest.

*Maximum:* Determines which numeric value in the cells is the largest.

*Count:* Determines how many of the values in the cells are numeric or date/time values.

*Product:* Multiplies all the numeric values in the cells.

- Choose More Functions to open the Function Browser. See "Using Functions" on page 96 for details about this tool.
- Choose Formula Editor to open the Formula Editor. See "Using the Formula Editor" on page 88 for instructions.

### Performing a Basic Calculation Using Column Values

Using the pop-up menu of the Function button in the toolbar makes it easy to perform basic calculations on adjacent values in a column and display the results.

### Here are ways to perform basic calculations using values in a column:

- To use values in a range of adjacent cells, select the cells, click Function in the toolbar, and choose a calculation from the pop-up menu.

Numbers places the formula and its result in the first empty cell beneath the selected cells. If there is no empty cell, Numbers adds a row to hold the result.

- To use all the values in a column, click the column's header cell or reference tab, click Function in the toolbar, and choose a calculation from the pop-up menu.

Numbers places the formula and its result in a footer row. If a footer row doesn't exist, Numbers adds one.

### Performing a Basic Calculation Using Row Values

Using the pop-up menu of the Function button in the toolbar makes it easy to perform basic calculations on adjacent values in a row and display the results.

### Here are ways to perform basic calculations using values in a row:

- To use values in a range of adjacent cells, select the cells, click Function in the toolbar, and choose a calculation from the pop-up menu.

Numbers places the formula and its result in the first empty cell to the right of the selected cells. If there is no empty cell, Numbers adds a column to hold the result.

- To use all the values in a row, click the row's header cell or reference tab, click Function in the toolbar, and choose a calculation from the pop-up menu.

Numbers places the formula and its result in a new column.

## Removing a Formula

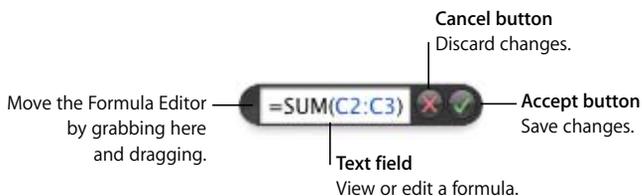
If you no longer want to use a formula that's associated with a cell, you can quickly remove the formula.

### To remove a formula from a cell:

- 1 Select the cell.
- 2 Press the Delete key.

## Using the Formula Editor

The Formula Editor lets you create and modify formulas.



### Here are ways to open the Formula Editor:

- Select a table cell and then type the equal sign (=).
- Double-click a table cell that contains a formula.
- Select a table cell, click Function in the toolbar, and then choose Formula Editor from the pop-up menu.
- Select a table cell and then choose Insert > Function > Formula Editor.

When the Formula Editor opens, it appears over the selected cell. To move the Formula Editor, hover the cursor over the left side of the Formula Editor until the cursor changes into a hand, then click and drag.

When you select a cell that contains a formula, its arguments are highlighted in color and the formula is displayed in the Formula Bar, which can also be used to edit a formula. See “Using the Formula Bar” on page 90 for details.

### Adding a New Formula with the Formula Editor

Use the Formula Editor to create a formula.

#### To add a new formula using the Formula Editor:

- 1 Select the cell in which you want to display the result of the formula.
- 2 Open the Formula Editor. For example, type the equal sign (=).
- 3 Use the text field to specify the formula, making sure the equal sign is the first character in your formula.

To learn techniques for including cell references in your formulas, see “Using Cell References” on page 91.

To learn about using operators in formulas, see “Using Operators” on page 94.

To learn how to insert a function into a formula, see “Using Functions” on page 96.

- 4 To save changes, press Return, press Enter, or click the Accept button in the Formula Editor. You can also click outside the table.

To close the Formula Editor and discard changes, press Esc or click the Cancel button in the Formula Editor.

### Editing a Formula with the Formula Editor

You can use the Formula Editor when you want to edit a formula.

#### To edit a formula:

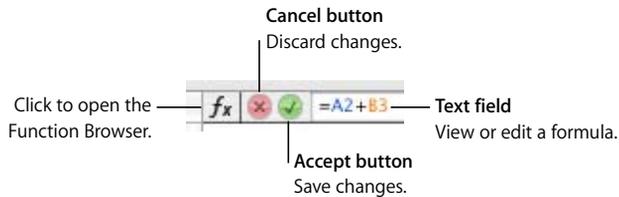
- 1 Double-click a table cell that contains a formula. The Formula Editor opens, with the formula displayed in the text field and its arguments highlighted in color.
- 2 Make changes as required. You can use the arrow keys to move the insertion point around in the text field.

- 3 To save changes, press Return, press Enter, or click the Accept button in the Formula Editor. You can also click outside the table.

To close the Formula Editor and discard changes, press Esc or click the Cancel button in the Formula Editor.

## Using the Formula Bar

The Formula Bar, located beneath the Format Bar, lets you create and modify formulas in a selected cell.



If you click a selected formula cell, the Formula Editor opens and you can use it to edit your formula instead of using the Formula Bar. See “Editing a Formula with the Formula Editor” on page 89 for details.

## Adding a New Formula with the Formula Bar

Use the Formula Bar to create a formula.

### To add a new formula using the Formula Bar:

- 1 Select the cell in which you want to display the result of the formula.
- 2 Click in the text field of the Formula Bar to enter the formula. Make sure that the equal sign (=) is the first character in your formula.

To learn techniques for including cell references in your formulas, see “Using Cell References” on page 91.

To learn about using operators in formulas, see “Using Operators” on page 94.

To learn how to insert a function into a formula, see “Using Functions” on page 96.

- 3 To save changes, press Return, press Enter, or click the Accept button in the Formula Bar.

To discard changes, press Esc or click the Cancel button in the Formula Bar.

## Editing a Formula with the Formula Bar

You can use the Formula Bar when you want to edit a formula.

### To edit a formula:

- 1 Select a table cell that contains a formula.  
The formula is displayed in the text field of the Formula Bar, and its arguments are highlighted in color.
- 2 Click in the Formula Bar, and make changes as required. You can use the arrow keys to move the insertion point around in the text field.
- 3 To save changes, press Return, press Enter, or click the Accept button in the Formula Bar.

To discard changes, press Esc or click the Cancel button in the Formula Bar.

## Using Cell References

You use cell references to identify specific cells in formulas. For example, if you add a formula that averages the values in two cells, you use cell references to identify those cells. The cells can be in the same table as the cell with the formula, or they can be in another table on the same or a different sheet.

You can create cell references using the letters and numbers of reference tabs or using header cell names:

- If your table has both a header row and a header column, you can identify a cell using the column name followed by the row name.  
For example, if a column is named 2006 and a row is named Class Enrollment, the cell where the row and column intersect would be referred to as 2006 Class Enrollment.
- You can use the letters and numbers of reference tabs to identify a specific cell. You specify the column letter and then the row number.  
For example, C55 refers to the fifty-fifth row in the third column.

## Adding Cell References to a Formula

To insert a cell reference, you can click a cell, click a reference tab, or select a range of cells when there's an insertion point in the text field of the Formula Editor or the Formula Bar. You can also insert a cell reference by typing it.

When you insert a cell reference by selecting cells or reference tabs, Numbers adds cell references that use header cell names if "Use header cell names as references" is selected in the General pane of Numbers preferences.

When you type a cell reference that includes the name of a header cell, table, or sheet, Numbers displays a list of suggestions that match what you've started to type. You can select from the list or continue typing.

**Here are ways to add a cell reference at the insertion point in the text field:**

- To create a reference to a specific cell by using your mouse, click the cell.

You can also type a reference to a specific cell. Use the column letter followed by the row number (A4) in the reference tabs or use the column name followed by the row name (2006 Class Enrollment).

If the other table is on a different sheet, click the sheet in the Sheets pane before selecting the cell.

To refer to a cell in a different table, use the table name followed by two colons (::) and then the cell identifier (Table 2::B5). To refer to a cell in a table on another sheet, use the sheet name first (Sheet 2::Table 2::2006 Class Enrollment) if the table name isn't unique in the spreadsheet.

- To add a reference to a list of individual cells, click each cell. If the references are arguments in a function, Numbers automatically inserts a comma (,) between the references, which you can replace with a different character if needed. For example, if you're in a location where the decimal separator is a comma, you can separate multiple cell references using a semicolon instead of a comma.

- To add a reference to a range of adjacent cells, drag over the cells you want to add.

You can also type or click the first cell, type a colon, and then type or click the last cell. For example B2:B5 refers to four cells in the second column. B2:C3 refers to two cells in the second column and two cells in the third column.

- To refer to all the cells in a column, click the column's reference tab or click its header cell if there is one.

You can type the reference by using the column letter (C or C:C) or the column name if there's a header cell. For example, SUM(B) or SUM(B:B) adds all the values in the cells of the second column.

- To refer to all the cells in a row, click the row's reference tab or click its header cell if there is one.

You can type the reference by using the row number (1:1) or the row name if there's a header cell. For example, SUM(1:1) adds all the values in the cells of the first row.

**Copying or Moving Formulas with Cell References**

You can copy or move a formula that contains cell references without invalidating the references.

**Here are techniques for relocating formulas:**

- To move a formula to a different cell, move the formula's cell by dragging it to another cell.

If the table is large and you want to move the formula to a cell that's out of view, select the cell, choose Edit > Mark for Move, select the other cell, and then choose Edit > Move. For example, if the formula =A1 is in cell D1 and you want to move the same formula to cell X1, select D1, choose Edit > Mark for Move, select X1, and then choose Edit > Move. The formula =A1 appears in cell X1.

- To move a cell that a formula refers to, move the cell by dragging it or use Edit > Mark for Move followed by Edit > Move.

For example, if the formula =A1 appears in cell D1 and you want to move cell A1 to cell D95, select A1, choose Edit > Mark for Move, select D95, and then choose Edit > Move. The formula in D1 becomes =D95.

- To paste a copy of a formula in a different cell and use the same cell references in both formulas, place a dollar sign (\$) in front of column and row identifiers (=A\$1). This technique creates what's called an *absolute cell reference*.

For example, if the formula =A1 appears in cell D1 and you want to paste a copy of the formula in cell E1, change the formula to =\$A\$1, select D1, copy it, and paste the copy into E1. The formula \$A\$1 is copied into cell E1. If you didn't change the formula to use an absolute cell reference the formula in E1 would be =B1.

## Applying a Formula Once to Cells in a Column or Row

When a table has header cells, you can use them to quickly apply a formula to all the cells in a row or column. The values in the cells are recomputed using the formula. This formula is called a *header formula*.

### To apply a header formula to cells in a column or row:

- 1 Select the header cell for the column or row.
- 2 Open the Formula Editor. For example, type the equal sign (=).
- 3 Type the formula you want to apply to each cell in the column or row.

For example, to assign values to the cells of column C that are five times greater than the corresponding cell in column B, you'd use the formula B\*5 or B:B\*5.

The formula is duplicated in all the cells in the column or row. In this example, cell C4 would contain the value computed by using the formula B4\*5.

- 4 Click the Accept button or press Return or Enter to save the formula.

## Handling Errors and Warnings

When a formula in a table cell is incomplete, contains invalid cell references, or is otherwise incorrect, or when an import operation creates an error condition in a cell, Numbers displays an icon in the cell. A blue triangle in the upper left of a cell indicates one or more warnings. A red triangle in the middle of a cell means that a formula error occurred.

### To view error and warning messages:

- Click the icon.

A message window summarizes each error and warning condition associated with the cell.

To have Numbers issue a warning when a cell referenced in a formula is empty, choose Numbers > Preferences and in the General pane select “Show warnings when formulas reference empty cells.”

## Using Operators

Use operators in formulas to perform arithmetic operations and compare values:

- *Arithmetic operators* perform arithmetic operations, such as addition and subtraction, and return numerical results.
- *Comparison operators* compare two values and return TRUE or FALSE.

### Performing Arithmetic Operations

To create a formula that performs an arithmetic operation, you use arithmetic operators. For example, to add three values in a column, you could create a formula that looks like this:  $A2 + A3 + A5$ .

Here are the basic arithmetic operators. For complete information about arithmetic operators that Numbers supports, see “Understanding the Arithmetic Operators” on page 95.

To perform this operation	Use this arithmetic operator	For example
Sum two values	+	$A2 + B2$
Subtract one value from another value	-	$A2 - B2$
Multiply two values	*	$A2 * B2$
Divide one value by another value	/	$A2 / B2$

### To add an arithmetic formula to a cell:

- 1 Select an empty cell for displaying the results of the formula.
- 2 Open the Formula Editor. For example, type an equal sign (=).
- 3 Enter the formula in the text field following the equal sign.

For example, to enter the formula  $A3 * B5 + B6$ , in the text field following the equal sign you could click or type A3, type \* (the multiplication operator), click or type B5, and then click B6 (if you don't type an operator before clicking, Numbers adds the plus sign (+) automatically when you're not specifying function arguments).

- 4 Click the Accept button or press Return or Enter to save the formula.

## Understanding the Arithmetic Operators

Arithmetic operators in table cell formulas perform arithmetic operations and return numerical results.

**Here are the arithmetic operators (examples presume that cell A2 contains 20 and that B2 contains 2):**

- The operator + returns the sum of two values.  
For example, A2 + B2 returns 22.
- The operator – returns the difference between two values.  
For example A2 – B2 returns 18.
- The operator \* returns the product of two values.  
For example, A2 \* B2 returns 40.
- The operator / returns the result of dividing one value by another value.  
For example, A2/B2 returns 10.
- The operator ^ returns the result of raising one value to the power of another value.  
For example, A2 ^ B2 returns 400.
- The operator % returns the result of dividing a value by 100.  
For example, A2% returns 0.2, formatted for display as 20%.

When a cell reference points to an empty cell, 0 is the value used.

When a cell reference points to a cell containing FALSE, 0 is used. If the cell contains TRUE, 1 is used. For example, TRUE + 1 returns 2.

Using a string with an arithmetic operator returns an error. For example, 3 + "hello" is not a correct arithmetic operation.

## Understanding the Comparison Operators

Comparison operators compare two values and return TRUE or FALSE.

**Here are the comparison operators (examples presume that cell A2 contains 20 and that B2 contains 2):**

- The operator = returns TRUE if two values are equal.  
For example, A2 = B2 returns FALSE.
- The operator <> returns TRUE if two values aren't equal.  
For example, A2<>B2 returns TRUE.
- The operator > returns TRUE if the first value is greater than the second value.  
For example, A2 > B2 returns TRUE.
- The operator < returns TRUE if the first value is less than the second value.  
For example, A2 < B2 returns FALSE.
- The operator >= returns TRUE if the first value is greater than or equal to the second value.  
For example, A2 >= B2 returns TRUE.
- The operator <= returns TRUE if the first value is less than or equal to the second value.  
For example, A2 <= B2 returns FALSE.

Strings are larger than numbers. For example, "hello" > 5 returns TRUE.

TRUE and FALSE can be compared with each other, but not with numbers or strings. TRUE > FALSE, and FALSE < TRUE, because TRUE is interpreted as 1 and FALSE is interpreted as 0. TRUE = 1 returns FALSE, and TRUE = "SomeText" returns FALSE.

## Using Functions

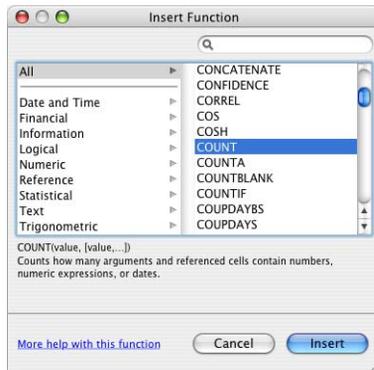
A function is a predefined, named operation (such as SUM and AVERAGE) that you can use to perform a calculation in a table cell.

There are several families of functions, ranging from financial functions that calculate interest rates, investment values, and more to statistical functions that calculate averages, probabilities, standard deviations, and more. See "About Functions" on page 193 for complete information about all the functions, including the arguments you specify to provide the data for functions to use in their calculations.

Although you can type a function into the text field of the Formula Editor or Formula Bar, you can also use the Function Browser to add a function to a formula.

**To use the Function Browser to add a function:**

- 1 Select the cell in which you want to add a function.
- 2 Click the Function Browser button in the Formula Bar, or choose Insert > Function > More Functions. The Function Browser opens.



- 3 Select a function.

To find a function, scroll through the list on the right, optionally subdividing the list by selecting a function category on the left. You can also search for a specific function within the selected function category by using the search field in the upper right.

- 4 Click Insert.

The Formula Editor is displayed in the cell, with the selected function in the text field, followed by one or more argument placeholders within parentheses.

- 5 Use the Formula Editor or Formula Bar to replace each placeholder with a cell reference or other value or perform any additional formula editing required.

You can convert table data into attractive charts. This chapter describes how to create and format charts.

Numbers provides tools for creating visually appealing charts to present some or all of the data in one or more tables. By default, the appearance of charts is coordinated with the template you're using, but you can adjust colors, textures, shadows, labels, and more to emphasize various chart elements.

## About Charts

You can turn data that appears in one or more tables into charts. Charts can visually reveal trends or relationships that aren't as apparent when you view the data in rows and columns.

A chart is linked to data in the table or tables it's based on. If you change table data, the chart updates automatically.

You can choose from a variety of chart types to present your data, including pie charts, line charts, bar charts, column charts, area charts, and scatter charts. Most charts have both two-dimensional and three-dimensional versions.

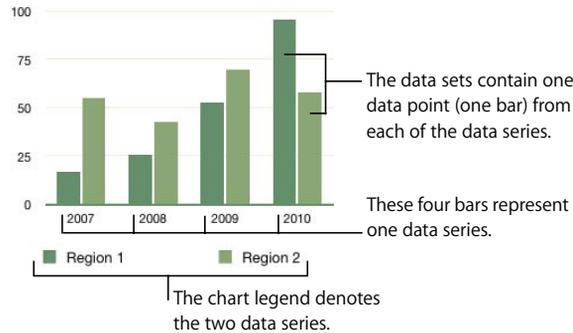
For example, a business may use a table to keep track of how many employees work in Region 1 and Region 2 each year. Such a table might have two rows (one for Region 1 and one for Region 2) and four columns (one for each year from 2007 through 2010).

	2007	2008	2009	2010
Region 1	17	26	53	96
Region 2	55	43	70	58

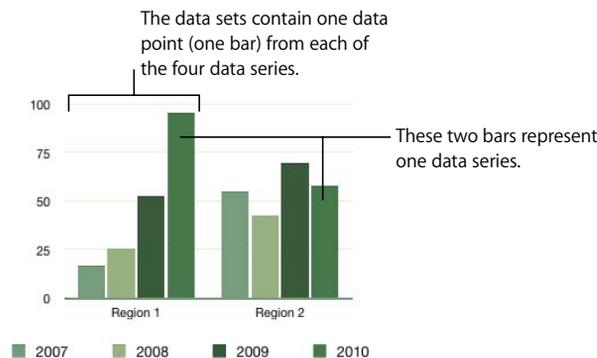
There are several ways to represent the data in this table in a chart. In a bar chart, for example:

- You can plot 2007 employee counts for Region 1 and Region 2 in side-by-side bars, followed by pairs of bars for 2008, 2009, and 2010. Such a chart would have two data series and four data sets.

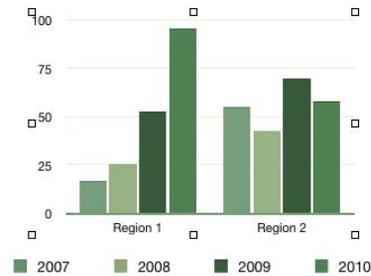
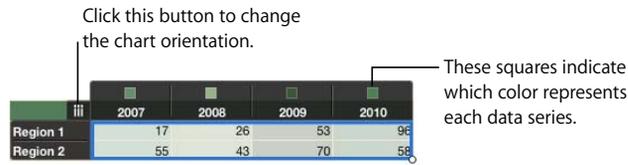
Region 1 and Region 2 are called *data series*; each region is represented by a series of data values. Data values (*data points*) for each region are represented by bars that are grouped side by side in the chart; each group is called a *data set* (2007 is a data set, 2008 is a data set, and so on).



- Alternatively, you can change the chart orientation so that data points are grouped by region rather than by year. In this case, the years are *data series* and the regions are *data sets*. The bar chart would contain two groups of bars, one for Region 1 and one for Region 2.



When you select a chart, the cells plotted in it are highlighted in the related table. In addition, colored squares appear next to columns and rows in the table to show which color represents each data series in the chart.



A button in the upper left of the table lets you switch between using columns and rows as data series.

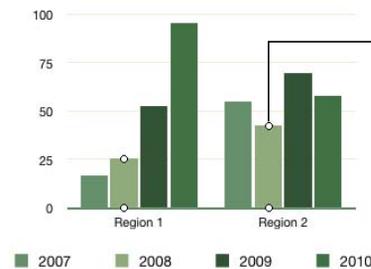
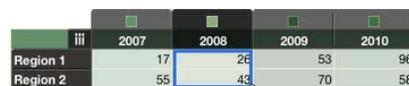


When the button looks like this, the columns are data series. Click the button to make rows the data series.



When the button looks like this, the rows are data series. Click the button to make columns the data series.

You can also click a series element in the chart to view its related data in the chart and the underlying table.



Selecting a bar highlights bars in the chart in the same data series as well as related values in the underlying table.

Data series are represented differently in different kinds of charts:

- In *column charts* and *bar charts*, a data series is represented by a series of bars in the same fill (color or texture).
- In a *line chart* (also called a *graph*), a data series is represented by a single line.
- In an *area chart*, a data series is represented by an area shape.
- In a *pie chart*, only a single data set (the first data point in each series) is represented on the chart.
- In a *scatter chart*, two columns of data are used to plot values for a single data series. Each pair of values determines the position of one data point.

## Adding a Chart

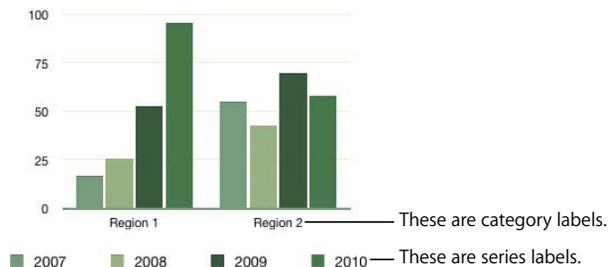
You can add a chart that shows all the data in a table or only data in selected cells of one or more tables.

When you add a chart, Numbers defines default data series and axis labels, but you can change the series or the labels:

- In most cases, if a table is square or if it's wider than tall, the table rows are the *default series*. Otherwise, the columns are the default series. To change the data series, select the chart and then click a data series button in the upper left of the related table.
- If a table contains header rows or cells, Numbers uses their contents to create *default axis labels*. In the absence of header cells, Numbers uses text in the first column or row as axis labels. Otherwise, placeholder text is used for labels.

*Series labels* identify the data series elements (individual bars, for example) in the chart.

*Category labels* identify data sets (groups of bars, for example) in the chart.



You can show and hide, edit, move, reorient, and format axis labels as “Adding Labels and Axis Markings” on page 108 describes.

### Here are ways to add a chart:

- To add a chart based on a table, select the table, click Charts in the toolbar, and choose a chart type from the pop-up menu.



On the pop-up menu, 2D charts are on the left, and 3D charts are on the right.

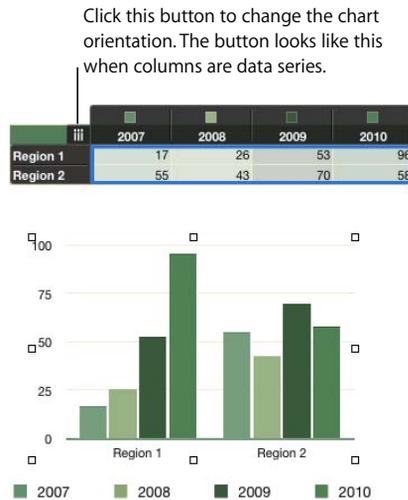
- The values in the table are plotted in the chart. If the table is empty, the chart is blank until you add values to table cells.
- To add a chart based on a range of adjacent table cells, click in a cell, and then click and drag to select other cells; you can also select a single cell and then hold down the Shift key to select cells. Then click Charts in the toolbar, and choose a chart type.
- To add a chart based on nonadjacent cells, hold down the Command key as you select cells from a table. Then click Charts in the toolbar, and choose a chart type.
- To add a chart based on data in more than one table, create a chart by selecting a table or cells in it. Then select the chart and Command-click or Command-drag cells in another table to add their data to the chart.
- To add a chart and a related table with placeholder values, make sure nothing is selected, click Charts in the toolbar, and choose a chart type.
- To add a scatter chart, see “Scatter Charts” on page 117.
- To draw a chart, hold down the Option key as you click Charts in the toolbar. Choose a chart type. The pointer changes into a crosshair; drag the crosshair across the canvas to create a chart that’s the size you want. To constrain the chart’s proportions, hold down the Shift key as you drag.

## Editing Charts

You can change the data plotted in a chart, change the plotting orientation to switch data series and data sets, move data series, change the chart type, and more.

## Changing the Plotting Orientation

A data series button in the upper left of the table lets you switch between using columns and rows as data series.



**To change the plotting orientation:**

- 1 Select the chart.
- 2 Click the data series button.

## Changing the Data Plotted in a Chart

When you change the data in a chart's related table cells, the chart is automatically updated. But you can also add data to and remove data from a chart without affecting the related table.

### Adding Data to a Chart

You can add data from cells that are adjacent or nonadjacent to cells already plotted, and you can add data in a new row or column.

**Here are ways to add data to a chart:**

- To add data from cells that aren't adjacent to cells already plotted, select the chart and then Command-click or Command-drag the cells in the table.
- To add data from cells that are adjacent to cells already plotted, select the chart and then Shift-click the cells in the table.
- To extend the range of adjacent cells whose values are plotted, select the chart. In the table, drag the circular control in the lower right of the range to the right or down. If the chart is a scatter chart, dragging lets you add only an even number of rows or columns.

- To add cells based on a new row or column, select the table and insert the row or column between cells that are already plotted. When you add data to the new cells, the data will be plotted in the chart.

### Adding Data to a Chart from Multiple Tables

You can add data to a chart from cells that are in more than one table.

#### To chart data in multiple tables:

- 1 Create a chart based on data from one table.
- 2 Select cells in another table.
- 3 Drag the selected cells into the chart. They're added as a new data series.

To view or change the chart's source data, click a data series in the chart to see its table and cells of origin.

### Removing Data from a Chart

You can delete values from only a chart, leaving them in the related table, or you can delete values from both a chart and its related table.

#### Here are ways to remove data from a chart:

- To remove a data point, select the table, select the cell in which the data resides, and press Delete. The value is removed from the table and the chart.  
If you delete a column or row that is part of a two-column pair plotted in a scatter chart, the related two-value data point is removed from the chart.
- To remove multiple individual cell values, select the table, use Shift-click or Command click to select the cells, and then press Delete. The values are removed from both the table and the chart.
- To shrink the range of adjacent cells whose values are plotted, select the chart. In the table, drag the circular control in the lower right of the range up or to the left. The cells that are deselected are no longer represented in the chart but the values remain in the table.
- To remove a data series, click the chart, select an element in the series or click the series label in the table, and then press Delete. The values are removed from the chart but remain in the table.
- To remove a data set, click the chart, select the category label in the table, and press Delete. The values are removed from the chart but remain in the table.

If the category has no label in the table, click the data series button in the table to convert the category to a series, select the series that contains the data you want to remove, and press Delete.

## Replacing a Data Series

You can change the row or column on which a data series is based to a different row or column.

### To replace a data series:

- 1 Select the chart.
- 2 Select the series you want to move, either by clicking the data series in the chart or by clicking the data series label in the table.
- 3 Drag the data series in the table to the row or column you want to use as a replacement.

## Deleting a Chart

You can delete a chart by deleting its related table(s), or you can delete only the chart.

### Here are ways to delete a chart:

- To remove the chart and not its related table(s), select it and press Delete.
- To remove both the chart and its related table(s), select the table(s) and press Delete.

## Moving a Chart

You can move a chart within a spreadsheet by dragging it or by cutting and pasting it. Its connections to related cells are maintained.

### Here are ways to move a chart:

- To move a chart to a different location on the same sheet, select it and drag it to the new location.
- To move a chart to a different sheet, in the sidebar select the chart and drag it to the new sheet.

You can also select the chart and cut it (Command-X), select the other sheet, and then paste it (Command-V). Drag the chart to refine its location on the sheet.

## Changing a Chart from One Type to Another

You can change a chart's type anytime you like.

### To change a chart from one type to another:

- 1 Select the chart.
- 2 Click Inspector in the toolbar, click the Chart Inspector button, and then choose a different chart type from the pop-up menu that appears when you click the chart icon in the upper left.

If you switch to a *pie chart*, the first data point in each series is represented as a wedge. See "Pie Charts" on page 113.

If you switch to a *scatter chart*, each point in the chart requires two values. If the chart is based on an odd number of rows or columns, the last row or column isn't plotted. See "Scatter Charts" on page 117.

If you switch to a *bar, column, area, or line chart*, each series in the new chart corresponds to a row or column in the table.

If you switch to a *3D version of a chart*, the Chart Inspector provides controls for managing object depth, lighting style, and more. See "3D Charts" on page 118.

Formatting you've applied to the chart you're changing may not be applied to the new chart. For example, the color fill attribute of data point elements (bars, wedges, and so on) has a different default value for each type of chart. If you've changed a column fill color and then change the chart to be a bar chart, the fill color change isn't retained.

- Depending on the type of chart, the attributes that may change when you change a chart's type are show value label, value label position, text style, series stroke, series shadow, series fill, data point symbol, and data point fill.
- Bar/column charts and stacked bar/column charts share attributes except for value label position. Also, bar/column charts have separate fills.
- 3D chart shadows are shared across chart types.

When you change a chart's type and the new type has some of the same attributes, those attributes don't change. Shared attributes include axes, gridlines, tick marks, axis labels, show minimum value, number format, borders, rotation, shadows, and 3D lighting style.

You'll learn more about these attributes throughout the remainder of this chapter.

## Formatting General Chart Attributes

You can resize and reposition charts and chart legends. You can add a title to a chart. You can format chart elements (fonts, textures, colors, axis and data point labels, and tick marks). You can adjust the angle and lighting style of 3D charts.

### Using a Legend

The chart legend describes the meaning of the colors used to plot data points in each data series.

■ Region 1                      ■ Region 2

You can show or hide a chart's legend, and you can reposition it.

### **Here are ways to work with a chart's legend:**

- To show the legend, select the chart and then select Show Legend in the Chart Inspector.
- To edit the labels in the legend, edit the series labels in the related table or select the legend and edit the text directly in the legend.
- To format the legend's text, see "Formatting Titles, Labels, and Legends" on page 112.
- To hide the legend, select the chart and then deselect Show Legend in the Chart Inspector.  
You can also select the legend and press Delete.
- To move the legend, select and then drag it.

### **Using a Chart Title**

You can add a title to a chart. The title can be formatted.

#### **Here are ways to work with a chart's title:**

- To add a title, select the chart and then select Show Title in the Chart Inspector. Replace the placeholder text with your title.
- To format the title's text, see "Formatting Titles, Labels, and Legends" on page 112.
- To hide the title, select the chart and then deselect Show Title in the Chart Inspector.

### **Resizing a Chart**

You can make a chart larger or smaller by dragging one of its selection handles or by using the Metrics Inspector.

#### **Here are ways to resize a chart:**

- Click the chart to select it, and then drag a selection handle.
- To maintain a chart's proportions, hold down the Shift key as you drag to resize the chart.
- To resize a chart in one direction, drag a side handle instead of a corner handle.
- To resize by specifying exact dimensions, click Inspector in the toolbar, click the Metrics Inspector button, and then click Metrics. In this pane, you can specify a new width, height, and angle of rotation, and you can change the chart's distance from the margins.

### **Rotating Charts**

There are several techniques for rotating 2D charts. You can't rotate (or flip) 3D charts. If a 3D chart is grouped with 2D charts, you can rotate the group, but only the 2D charts in the group will rotate.

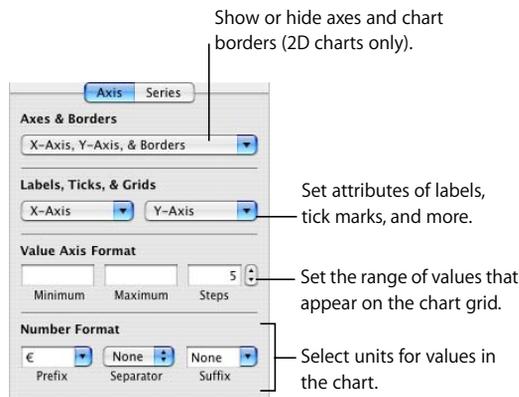
### Here are ways to rotate 2D charts:

- Select the chart, hold down the Command key, move the pointer toward a selection handle until it changes to a curved, double-headed arrow, and then drag a selection handle.
- To rotate a chart in 45-degree increments, press the Shift and Command keys while dragging a selection handle.
- Click Inspector in the toolbar, click the Metrics Inspector button, and then drag the Rotate wheel or use the Angle controls to set the angle of the chart.

Pie charts can also be rotated using the Chart Inspector (see “Rotating 2D Pie Charts” on page 115).

## Adding Labels and Axis Markings

Use the Axis pane in the Chart Inspector to format the grid and general look of chart axes.



Most charts have two axes, an X-axis and a Y-axis. Depending on the type of chart, data points are plotted on one of the axes and data sets are grouped on the other axis. The data point axis is called the *value axis*, and the data set axis is called the *category axis*.

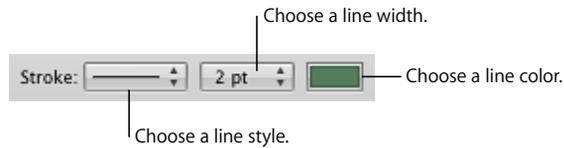
### Showing Axes and Borders

You can show any or all of these elements of a chart: the X-axis, the Y-axis, and chart borders.

#### To show axes and borders:

- 1 Select a chart.
- 2 Click Inspector in the toolbar, click the Chart Inspector button, and then click Axis.
- 3 Choose one or more items from the Axes & Borders pop-up menu to select the items. A selected item has a checkmark next to it; choose the item again to deselect it.

To format the border stroke and color, select the chart and use the line style controls on the Format Bar.



## Using Axis Titles

You can add a title to a chart's X-axis and Y-axis. The title can be formatted.

### Here are ways to work with an axis title:

- To add an axis title, select the chart and then select Show Category Title from the X-Axis or Show Value Title from the Y-Axis pop-up menu in the Axis pane of the Chart Inspector. Replace the placeholder text with your title.
- To format the title's text, see "Formatting Titles, Labels, and Legends" on page 112.
- To hide an axis title, select the chart and then deselect Show Category Title from the X-Axis or Show Value Title from the Y-Axis pop-up menu in the Axis pane of the Chart Inspector.

## Showing Data Point Labels

You can display data point values on columns, bars, pie wedges, and other chart elements of 2D and 3D charts.

### To format data point labels:

- 1 Select the chart.
- 2 Click Inspector in the toolbar, click the Chart Inspector button, and click Series.
- 3 Choose Show Value from the Data Point Settings pop-up menu.

To display the value as a percentage or logarithmic value instead of an absolute value, choose Percentage or Logarithmic in the X-Axis or Y-Axis pop-up menu on the Axis pane.

For pie charts, you display values as percentages by choosing Show Pie Values as Percentages from the Data Point Settings pop-up menu on the Series pane. To display the data series name for a wedge, choose Show Series Name from the Data Point Settings pop-up menu.
- 4 Select a label location from the Data Point Settings pop-up menu (for example, Middle or Below Right).
- 5 Specify the number of decimal places to display by entering a number in the Decimals field.
- 6 To format the data point labels, see "Formatting Titles, Labels, and Legends" on page 112.

## Formatting the Value Axis

You can set the values and units to be displayed along the *value axis*, the axis on which you read the data point values. For column charts (vertical bars), line charts, and area charts, the Y-axis is the value axis. For horizontal bar charts, the X-axis is the value axis. For scatter charts, both axes are value axes. (Pie charts don't have a value axis. To read about formatting pie charts, see "Pie Charts" on page 113.)

### To format the value axis:

- 1 Select a chart.
- 2 Click Inspector in the toolbar, click the Chart Inspector button, and then click Axis.
- 3 To set the value at the chart origin, type a number in the Minimum field (under Value Axis Format).  
The Minimum value cannot be higher than the minimum value of your entire data set.
- 4 To set the highest number displayed on the value axis, type a number in the Maximum field.  
The Maximum value cannot be lower than the maximum value of your entire data set.
- 5 To specify the number of axis markings between the minimum and maximum values, specify a number in the Steps field.
- 6 To display the minimum data value on the value axis, select Show Value Labels and Show Minimum Value from the Labels, Ticks, & Grids X-Axis or Y-Axis pop-up menu, depending on the chart.
- 7 To specify units for axis values, under Number Format type text in the Prefix or Suffix field (or choose a symbol from the pop-up menus).
- 8 To display values on the value axis as logarithmic values, choose Logarithmic from the X-Axis or Y-Axis pop-up menu, depending on the chart. This option is available only for 2D bar/column charts that aren't stacked and for line charts. You can't plot negative values on the log axis.
- 9 To display values on the value axis of stacked charts as percentages, choose Percentage from the X-Axis or Y-Axis pop-up menu on the Axis pane.

For pie charts, you display values as percentages by choosing Show Pie Values as Percentages from the Data Point Settings pop-up menu.

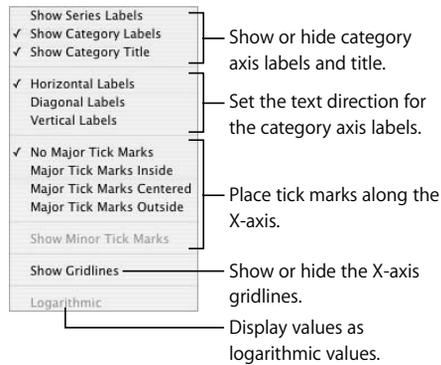
### Placing Labels, Gridlines, and Tick Marks

The X-Axis and Y-Axis pop-up menus in the Axis pane of the Chart Inspector provide an array of options for placing tick marks, labels, and gridlines along the value axis or the category axis. The options in these pop-up menus vary depending on the kind of chart you select.

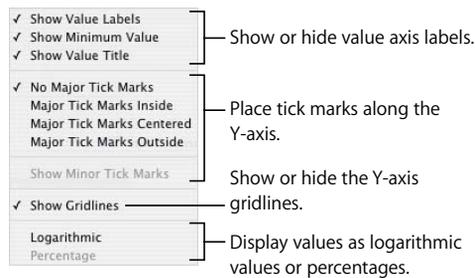
For vertical bar charts (column charts), line charts, and area charts, the Y-axis is the value axis and the X-axis is the category axis. For horizontal bar charts, the X-axis is the value axis. For scatter charts, both axes are value axes. For 3D charts, the X and Y axes are the same as their 2D counterparts.

**To format axis markings:**

- 1 Select the chart.
- 2 Click Inspector in the toolbar, click the Chart Inspector button, and then click Axis.
- 3 To format the X-axis, choose an option from the X-Axis pop-up menu. The menu for a column chart looks like this:



- 4 To format the Y-axis, choose an option from the Y-Axis pop-up menu. Here's what the menu looks like for a column chart:



- 5 To edit axis labels based on header column or row values, select the table and edit the labels.

If you want axis labels to differ from header column or row values, select the chart and edit the labels. Changing header cells no longer affects the axis labels after you edit the labels in the chart.

## Formatting the Elements in a Data Series

You can use a variety of visual effects to enhance the appearance of data series elements, such as bars, wedges, and area shapes.

### To format data series elements:

- 1 To format all data series, select the chart.

To format elements in a single data series, select the chart and then click one of the elements in the series.

For all chart types except pie charts, selecting one element (such as a bar) of a series automatically selects the full series. For pie charts, you select individual wedges.

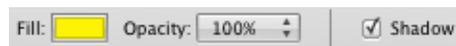
- 2 To fill series elements with specially designed colors or textures, click Inspector in the toolbar, click the Chart Inspector button, and then click Chart Colors.

Choose a fill type (for example, 3D Texture Fills) from the first pop-up menu, and choose a fill collection (for example, Marble or Wood) from the second pop-up menu.

To fill all the elements in all the data series, click Apply All. The first fill is applied to elements in the first series, the second fill to elements in the second series, and so on.

To fill elements in a single data series, drag the fill to an element (bar, column, and so on) in the series.

- 3 To adjust the opacity, stroke, shadow, and other graphical attributes of series elements, click the Graphic Inspector button. You can also use the Format Bar to control the fill color, opacity, and shadow of the entire chart or individual data series in the chart.



- 4 To adjust series element colors, see “Filling an Object with Color” on page 160.
- 5 To use one of your own images to fill series elements, see “Filling an Object with an Image” on page 162.
- 6 To format data point labels, see “Showing Data Point Labels” on page 109.

“Formatting Specific Types of Charts” on page 113 provides instructions for formatting charts of particular types.

## Formatting Titles, Labels, and Legends

You can change the size and appearance of chart and axis titles, axis labels, data point labels, and legends.

### To format the text of labels and legends:

- 1 Select the text you want to format.

To format all chart titles and labels, click the chart to select it. If you select the text for one data point or axis label, all the text of that kind is also selected. You change the font for a chart legend separately.

- 2 You can use the Format Bar to format font characteristics and style. For additional formatting options, use the Format menu or the Font panel. See “Using the Format Menu to Format Text” on page 121 and “Using the Font Panel to Format Text” on page 123 for instructions.

### Adding Descriptive Text to a Chart

You can add descriptive text to a chart, such as when you want to provide background information for a particular data point.

#### To add text:

- 1 Create a text box. See “Adding Text Boxes” on page 141 for instructions.
- 2 Drag the text box to where you want it on the chart.
- 3 Type text in the text box.

Optionally group the chart and the text box so the text stays with the chart. Shift-click to select both the chart and the text box, and then choose Arrange > Group.

## Formatting Specific Types of Charts

Different chart styles offer unique options for formatting their elements.

### Pie Charts

For pie charts, Numbers plots only the first data point for each data series. If the data series are in rows, only the first column is charted; if the data series are in columns, only the first row is charted.

Thus, one pie chart represents a single data set, and each wedge is one element in that set. You can chart any data set by moving it to the first row or column.

You can format a pie chart as a whole, or you can format individual wedges.

#### Selecting Individual Pie Wedges

If you want to format one or more wedges, you need to select them first.

#### Here are ways to select pie wedges in a selected pie chart:

- To select a single wedge, click it.
- To select all the wedges, select any wedge and press Command-A.
- To select nonadjacent wedges, hold down the Command key as you select each wedge.
- To select a continuous range of wedges, select the first wedge, and then hold down the Shift key as you select the last wedge.

## Showing Series Names in a Pie Chart

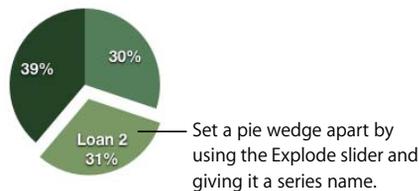
On pie charts, you can display series names.

**To show series names in a pie chart:**

- 1 Select the chart or individual pie wedges.
- 2 Click Inspector in the toolbar, click the Chart Inspector button, and then click Series.
- 3 Choose Show Series Name from the Data Point Label pop-up menu.
- 4 Choose Inside or Outside from the Data Point Label pop-up menu.

## Separating Individual Pie Wedges

To make pie wedges more visually prominent, you can separate them from the pie. You can add a series name to separated wedges to further enhance their prominence, as “Showing Data Point Labels” on page 109 describes.



**Here are ways to separate individual pie wedges:**

- To move a single wedge away from the center of a 2D or 3D pie chart, select it and then drag it or use the Explode control on the Series pane of the Chart Inspector.
- To separate all the wedges away from the center of a 3D pie chart, select the chart before using the Explode control.

## Adding Shadows to Pie Charts and Wedges

You can put shadows on individual pie wedges or on the pie as a whole. Putting shadows on individual wedges makes it look as if the wedges are on different layers.

When you add a shadow to a pie wedge, it's a good idea to separate it first. See “Separating Individual Pie Wedges,” earlier in this section, for instructions.

**To add shadows:**

- 1 Select the chart or individual pie wedges.
- 2 Click Inspector in the toolbar, click the Chart Inspector button, and then click Series.
- 3 To add shadows to wedges, choose Individual from the Shadow pop-up menu.  
To add shadows to the chart as a whole, choose Group from the Shadow pop-up menu.
- 4 To set shadow attributes, use the Graphic Inspector. See “Adding Shadows” on page 156 for instructions.

## Adjusting the Opacity of Pie Charts

You can change the opacity of the chart and individual chart elements, such as the legend. See “Adjusting Opacity” on page 158 for more information.

## Rotating 2D Pie Charts

You can use various techniques for rotating a 2D pie chart.

### Here are ways to rotate a pie chart:

- Select the chart, click Inspector in the toolbar, click the Chart Inspector button, click Series, and then use the Rotation Angle wheel or field.
- Click Inspector in the toolbar, click the Metrics Inspector button, and then drag the Rotate wheel or use the Angle controls to set the angle of the chart.
- Select the chart, hold down the Command key and move the pointer toward a selection handle until it changes to a curved, double-headed arrow, and then drag a selection handle.
- To rotate the chart in 45-degree increments, press the Shift and Command keys while dragging a selection handle or the Rotate wheel.

## Bar and Column Charts

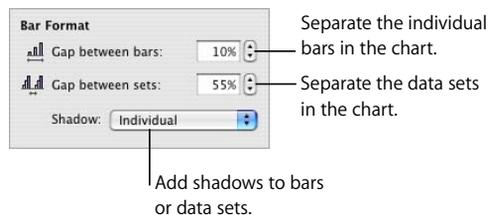
You can apply shadows to individual data series or to the entire chart. You can adjust the opacity for the chart as a whole or for individual series (but not individual bars). You can also adjust the spacing between data sets or individual bars.

## Adjusting Spacing of Bar and Column Charts

You can adjust spacing between individual bars or data sets.

### To adjust spacing:

- 1 Select the chart.
- 2 Click Inspector in the toolbar, click the Chart Inspector button, and then click Series.



- 3 To change the space between bars, type a value (or click the arrows) in the “Gap between bars” field.

To change the space between data sets, specify a value in the “Gap between sets” field.

The value is the percentage of the bar thickness. Decreasing the space between the bars makes them thicker.

You can also move the pointer near a bar edge until it becomes a double-headed arrow, and then drag to make the bars thicker or thinner.

### Adding Shadows to Bar and Column Charts

You can add shadows to each bar in the chart or to each group of bars.

If you want to add shadows to individual bars, it's a good idea to separate them first. See "Adjusting Spacing of Bar and Column Charts" on page 115 for instructions.

**To add shadows:**

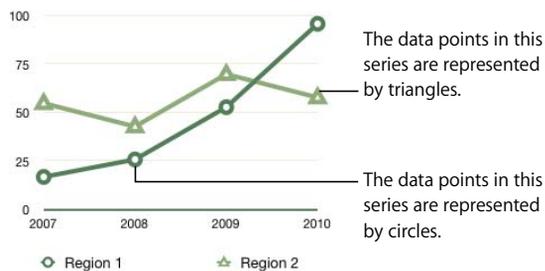
- 1 Select the chart.
- 2 Click Inspector in the toolbar, click Chart Inspector, and then click Series.
- 3 To add shadows to individual bars, choose Individual from the Shadow pop-up menu.  
To add shadows to each group of bars, choose Group from the Shadow pop-up menu.
- 4 To set shadow attributes, use the Graphic Inspector. See "Adding Shadows" on page 156 for instructions.

### Adjusting the Opacity of Bar and Column Charts

You can change the opacity of the chart and individual chart elements, such as the legend. See "Adjusting Opacity" on page 158 for more information.

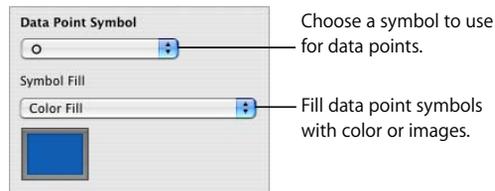
### Area Charts and Line Charts

In area and line charts, you can use symbols (circles, triangles, squares, and diamonds) to represent data points.



### Here are ways to format area charts and line charts:

- To format symbols, select a data series (area shape or line), click Inspector in the toolbar, click the Chart Inspector button, and then click Series. Choose a symbol from the Data Point Symbol pop-up menu.



Use the options on the Symbol Fill pop-up menu to add color or images to the symbols. See “Filling an Object with an Image” on page 162 and “Filling an Object with Color” on page 160 for instructions.

- To set the line color in line charts, select a line, click Inspector in the toolbar, click the Graphic Inspector button, and then use the Stroke controls. See “Changing the Style of Borders” on page 155 for instructions.
- To add shadows to line or area charts, select a data series (area shape or line), click Inspector in the toolbar, click the Graphic Inspector button, and then use the Shadow controls. See “Adding Shadows” on page 156 for instructions.

## Scatter Charts

Scatter charts display data differently than the other kinds of charts. They require at least two columns or rows of data to plot values for a single data series. To show multiple data series, you use additional two-column or two-row pairs.

Each pair of values determines the position of one data point. The first data value in the pair is the X-axis of the point. The second data value is the Y-axis of the point.

### Here are ways to work with a scatter chart:

- To add the default scatter chart and related table with placeholder data, make sure nothing is selected, click Charts in the toolbar, and choose the scatter chart.
- To set up a table that provides data for a scatter chart, use two columns or two rows of data for each data series. If the cells selected when you add the chart represent an odd number of rows or columns, the last row or column isn't plotted.
- To format a symbol for a data series, see “Formatting the Elements in a Data Series” on page 112.
- To specify axis settings, use the Axis pane of the Chart Inspector. Because both axes of scatter charts have values, value axis format settings apply to both X-axis and Y-axis. Each axis can have its own number format. See “Formatting the Value Axis” on page 110 for instructions.

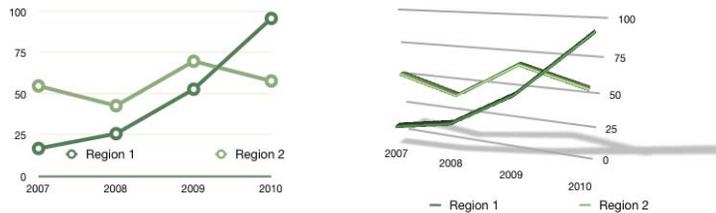
## 3D Charts

All the chart types except scatter charts can be displayed as 3D charts.

Here are 2D and 3D versions of a pie chart.



And here are 2D and 3D versions of a line chart.



**To define 3D scene settings:**

- 1 Select a 3D chart.
- 2 Click Inspector in the toolbar, click the Chart Inspector, and then click 3D Scene.
- 3 Modify the chart's viewing angle, lighting style, and depth as desired using the 3D Scene controls.

*Viewing angle arrows:* Drag an arrow to adjust the angle. Click the vertical arrow and drag up or down to move the chart up or down. Click the horizontal arrow and drag side to side to move the chart left or right. To move the chart both ways, click the intersection of the arrows and drag.

*Lighting Style:* Choose an item from this pop-up menu to adjust the lighting effect.

*Chart Depth:* Slide this control to increase or decrease the depth of the 3D elements.

This chapter describes how to add and modify the appearance of text, including lists.

In Numbers spreadsheets, you can place text in text boxes, table cells, and shapes.

## Adding Text

Add text by typing it in a table cell, text box, or shape.

- To learn about adding text to a text box or shape, see “Using Text Boxes and Shapes to Highlight Text” on page 141.
- To learn how to add text to table cells, see “Working with Text in Cells” on page 55.
- To add text that’s formatted as a list, see “Using Bulleted, Numbered, and Ordered Lists (Outlines)” on page 137.

## Deleting, Copying, and Pasting Text

The Edit menu contains commands that help you perform text editing operations.

### Here are ways to edit text:

- To copy (or cut) and paste text, select the text and choose Edit > Copy or Edit > Cut. Click where you want to paste the text.

To have the copied text retain its style formatting, choose Edit > Paste.

To have the copied text take on the style formatting of the text around it, choose Edit > Paste and Match Style.

- To delete text, select the text and choose Edit > Delete or press the Delete key.

If you accidentally delete text, choose Edit > Undo to restore it.

When you use the Copy or Cut command, the selected text is placed in a holding area called the Clipboard, where it remains until you choose Copy or Cut again or you turn off your computer. The Clipboard holds the contents of only one copy or cut operation at a time.

## Selecting Text

Before you format or perform other operations on text, you need to select the text you want to work with.

### Here are ways to select text:

- To select one or more characters, click in front of the first character and drag across the characters you want to select.
- To select a word, double-click the word.
- To select a paragraph, click three times quickly in the paragraph.
- To select blocks of text, click the start of a text block, and then click the end of another text block while holding down the Shift key.
- To select from the insertion point to the beginning of the paragraph, press the Up Arrow key while holding down the Shift and Option keys.
- To select from the insertion point to the end of the paragraph, press the Down Arrow key while holding down the Shift and Option keys.
- To extend the selection one character at a time, press the Left Arrow or Right Arrow key while holding down the Shift key.
- To extend the selection one line at a time, press the Up Arrow or Down Arrow key while holding down the Shift key.
- To select multiple words or blocks of text that are not next to each other, select the first amount of text you want, and then select additional text while holding down the Command key.

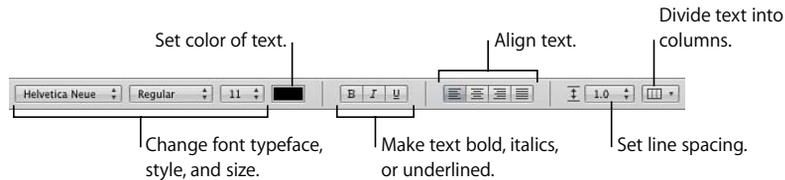
## Formatting Text Size and Appearance

You can change text font, color, style, and more using the Format menu, the Font panel, and the Format Bar.

The Format menu and Font panel are the primary methods for formatting table cell text. The Format Bar is a convenient tool for formatting text in text boxes and shapes.

## Using the Format Bar to Format Text

The Format Bar makes changing the size and appearance of text in a text box, shape, or comment quick and easy. When text in a text box, shape, or comment is selected, you can change the font style and size, adjust the color of the text, make text bold or italics or underlined, align text, set line spacing, and format the text into columns.



## Using the Format Menu to Format Text

The items in the Font submenu of the Format menu give you basic control over the size and appearance of text.

### Making Text Bold or Italic Using the Menus

You can make characters bold or italic.

#### To make text bold or italic:

- 1 Select the text you want to make bold or italic, or click where you want to type new text.
- 2 Choose Format > Font > Bold. Or choose Format > Font > Italic.

Some fonts contain several bold and italic typefaces. To choose from a variety of bold and italic typefaces, use the Font panel. See “Using the Font Panel to Format Text” on page 123.

### Creating Outlined Text Using the Menus

You can change text to appear as a stenciled outline.

#### To create outlined text:

- 1 Select the text you want to make outlined, or click where you want to type new text.
- 2 Choose Format > Font > Outline.

Outlined text you create in Numbers may look different if the spreadsheet is opened in another application. If you plan to share a spreadsheet that contains outlined text with people who don't have Numbers installed on their computers, export the spreadsheet as a PDF file and then share this file with others.

## Underlining Text Using the Menus

You can underline text and then format the underline to change the underline style or color.

### To underline text:

- 1 Select the text you want to underline, or click where you want to type new text.
- 2 Choose Format > Font > Underline.

To modify the underline style or color, click Fonts in the toolbar and use the Text Underline button in the Font panel. See “Using the Font Panel to Format Text” on page 123.

## Changing Text Size Using the Menus

You can change the point size of text to make the text larger or smaller.

### To change the size of text:

- 1 Select the text you want to resize.
- 2 To change the text size in 1-point increments, choose Format > Font > Bigger. Or choose Format > Font > Smaller.

You can also add Bigger and Smaller icons to the toolbar. Choose View > Customize Toolbar, drag the icons to the toolbar, and then click Done.

To specify a precise size for selected text, click Fonts in the toolbar and use the Size controls in the Font panel. See “Using the Font Panel to Format Text” on page 123.

## Making Text Subscript or Superscript Using the Menus

You can raise or lower text from its baseline.

### To make text subscript or superscript:

- 1 Select the text you want to raise or lower, or click where you want to type new text.
- 2 To create a subscript or superscript that has a smaller font size than the text it accompanies, choose Format > Font > Baseline > Subscript. Or choose Format > Font > Baseline > Superscript.
- 3 To raise or lower text without reducing its font size, choose Raise or Lower from the Baseline submenu.
- 4 To restore text to the same baseline as the body text, choose Use Default from the Baseline submenu.

You can add Subscript and Superscript icons to the toolbar. Choose View > Customize Toolbar, drag the icons to the toolbar, and then click Done.

## Changing Text Capitalization Using the Menus

You can quickly make blocks of text all uppercase or lowercase, or format text as a title.

### To change text capitalization:

- 1 Select the text you want to change, or click where you want to type new text.
- 2 Choose Format > Font > Capitalization and choose an option from the submenu.

Choose *All Caps* to change the text to capitals.

Choose *Small Caps* to change the text to smaller capitals with larger capitals for uppercase letters.

Choose *Title* to change the text to a title format, which capitalizes the first letter of each word.

Choose *None* to change text from all capitals to initial caps. Uppercase characters, such as the first word of each sentence, are capitals but the rest are lowercase.

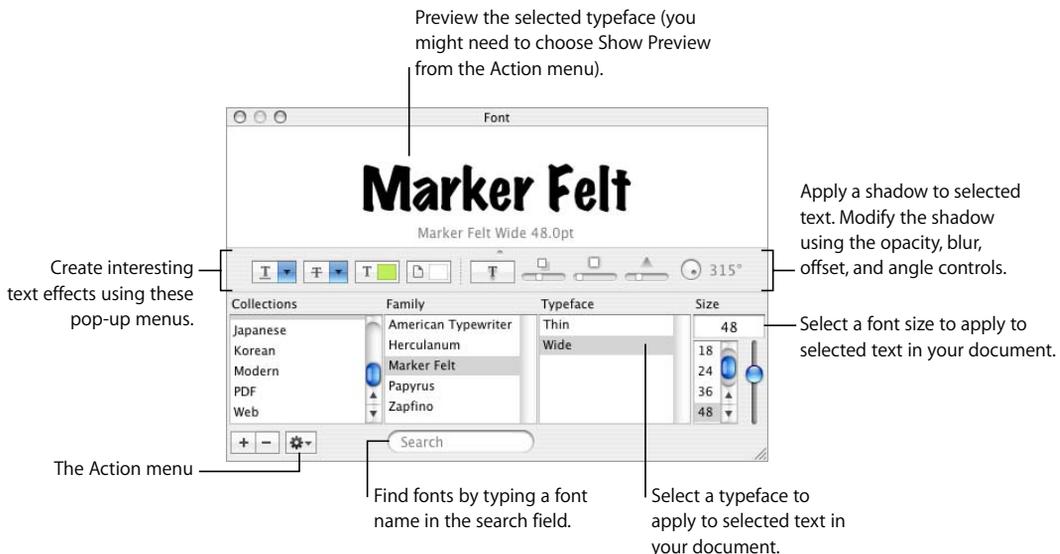
## Using the Font Panel to Format Text

The Mac OS X Font panel gives you access to all the fonts installed on your computer. It provides a preview of the available typefaces (such as bold and italic) and sizes for each font. The buttons in the Font panel let you add underlines, strikethrough lines, color, and shadow to text. You can even change the background page color in the Font panel.

For information on installing fonts, creating and managing font collections, or troubleshooting font-related issues, see Mac Help.

### To open the Font panel:

- Click Fonts in the toolbar.



You can change the appearance of any text in your spreadsheet by selecting it and then selecting options in the Font panel. When you make formatting changes in the Font panel, the selected text changes right away, so you can try different formatting options and quickly see what looks best.

Here is a summary of what the text effects pop-up menus do, from left to right:

- The Text Underline pop-up menu lets you choose an underline style (such as single or double).
- The Text Strikethrough pop-up menu lets you choose a strikethrough style (such as single or double).
- The Text Color pop-up menu lets you apply a color to text.
- The Document Color pop-up menu lets you apply a color behind a paragraph.
- The Text Shadow button applies a shadow to selected text.
- The Shadow Opacity, Shadow Blur, Shadow Offset, and Shadow Angle controls control the appearance of the shadow.

If you don't see the text effects buttons, choose Show Effects from the Action pop-up menu in the lower-left corner of the Font panel.

### **Making the Font Panel Easy to Use**

If you frequently use the Font panel, there are several techniques for saving time.

#### **Here are tips for using the Font panel:**

- To quickly locate fonts you frequently use, organize them into font collections. Click the Add (+) button to create a font collection, and then drag a typeface into the new collection.
- To make it easy to change fonts often, leave the Font panel open. If it takes up too much space on your screen, you can shrink it by dragging its resize control (the bottom-right corner of the panel), so that only the font families and typefaces in your selected font collection are visible. To close the panel, click the Fonts button again or the Close button in the upper-left corner of the Font panel.

### **Changing Fonts Using the Font Panel**

The Font panel gives you extensive control over fonts. Use size controls and typography settings to customize the appearance of your text.

#### **To modify the font of selected text:**

- 1 Click Fonts in the toolbar.
- 2 In the Font panel, select a font style in the Family column and then select the typeface in the Typeface column.

If you don't see all the font families you know are installed on your computer, select All Fonts in the Collections column or type the name of the font you are looking for in the search field at the bottom of the Font panel.

A preview of the selected font appears in the preview pane at the top of the Font panel. If you don't see a preview pane, choose Show Preview from the Action pop-up menu in the lower-left corner of the Font panel.

- 3 Adjust the font size using the size slider or other size controls.
- 4 Adjust the typography settings of the selected font by choosing Typography from the Action pop-up menu. In the Typography window, click the disclosure triangles to see and select the different typography effects that are available for the selected font. Different fonts have different typography effects available. See “Using Advanced Typography Features” on page 129 for more information.

### Changing Underlining Using the Font Panel

You can use the Font panel to change the appearance of underlines.

#### To modify underlining of selected text:

- 1 Click Fonts in the toolbar.
- 2 Click the Text Underline button in the Font panel (the first button on the left), and choose None, Single, or Double from the pop-up menu.
- 3 To change the underline color, choose Color from the Text Underline pop-up menu, and then select a color in the Colors window.

### Adding a Strikethrough to Text Using the Font Panel

You can mark text with a strikethrough line, and make the line's color different from the text color.

#### To add a strikethrough to selected text:

- 1 Click Fonts in the toolbar.
- 2 Click the Text Strikethrough button (the second button from the left), and choose None, Single, or Double from the pop-up menu. A single or double strikethrough appears through the selected text in the same color as the text.
- 3 To change the strikethrough color, choose Color from the Text Strikethrough pop-up menu, and then select a color in the Colors window. The strikethrough takes on the color you select in the Colors window, but the text remains its original color.

### Changing Text Color Using the Font Panel

Changes made to text color in the Font panel will override text color changes made in the Text Inspector, and vice versa. (To read about changing color using the Text Inspector, see “Changing Text Color” on page 133.)

#### To modify the color of selected text:

- 1 Click Fonts in the toolbar.
- 2 Click the Text Color button menu in the Font panel (the third button from the left), and then select a color in the Colors window. See “Using the Colors Window” on page 161 for instructions.

## Changing the Paragraph Background Color Using the Font Panel

You can use the Font panel to add a color behind a paragraph.

**To modify the background color of a selected paragraph:**

- 1 Click Fonts in the toolbar.
- 2 Click the Document Color button in the Font panel (the fourth button from the left), and then select a color in the Colors window. See “Using the Colors Window” on page 161 for instructions.

## Creating Shadows on Text Using the Font Panel

You can use the Font panel to create and format shadows on text.

**To define shadows on selected text:**

- 1 Click Fonts in the toolbar.
- 2 Click the Text Shadow button in the Font panel (the fifth button from the left).
- 3 Drag the shadow opacity slider (the first slider on the left) to the right to make the shadow darker.
- 4 Drag the shadow blur slider (the middle slider) to the right to make the shadow more diffuse.
- 5 Drag the shadow offset slider (the third slider) to the right to separate the shadow from the text.
- 6 Rotate the Shadow Angle wheel to set the direction of the shadow.

You can also set text shadows in the Graphic Inspector, as described in “Adding Shadows” on page 156.

## Adding Accents and Special Characters

If you need to type characters with accent marks (such as ü), mathematical symbols, arrows, or other special characters, you can use the International preferences pane or the Character Palette. You can also see where characters are located on keyboards used for other languages by using the Keyboard Viewer (for example, you can see how the keys on an Italian keyboard are laid out). All of these are built-in tools of Mac OS X.

### Adding Accent Marks

You can use the Keyboard Viewer available in System Preferences to add accent marks to characters.

**To add accent marks:**

- 1 Choose Apple > System Preferences and click International.
- 2 Click Input Menu, then select the checkbox next to Keyboard Viewer.

- 3 Choose Show Keyboard Viewer from the Input menu on the right side of the menu bar (the one that looks like a flag or alphabetical symbol).

The Keyboard Viewer shows the characters for your keyboard. (If you've selected a different keyboard layout or input method in the Input menu, it shows the characters for the selected keyboard layout.) For example, if U.S. is chosen in the Input menu, you see the characters that appear on a U.S. keyboard in the Keyboard Viewer.

- 4 To see the different accent marks that you can type highlighted in the Keyboard Viewer, press Option, or the Option and Shift keys.

The accent mark keys appear with white outlines. Depending on your keyboard, you may not need to press any of the modifier keys to see the accent keys.

- 5 Place the insertion point in your spreadsheet where you want to type.
- 6 Press the modifier key you pressed in step 4 (Shift, Option, Option-Shift, or none) and press the key on your keyboard that is in the same place as the accent you see in the Keyboard Viewer. Then release the modifier key and press the key for the character you want to accent.

The accent key modifies the key you type next. For example, on a U.S. keyboard, to make the é appear, press Option and E (the accent key), then press E (the letter on which you want that accent to appear).

### Viewing Keyboard Layouts for Other Languages

You can use the Keyboard Viewer available in System Preferences to see where characters are located on keyboards used for other languages.

You must have fonts installed for the language you want to see in the Keyboard Viewer.

#### To see keyboard layouts for different languages:

- 1 Choose Apple > System Preferences and click International.
- 2 Click Input Menu, then select the checkbox next to Keyboard Viewer.
- 3 To see the character layout on keyboards used in different countries, select the On checkbox next to the country's keyboard layout or input method.
- 4 Choose Show Keyboard Viewer from the Input menu on the right side of the menu bar (the one that looks like a flag or alphabetical character).

The Keyboard Viewer shows the characters for the keyboard layout or input method selected in the Input menu. For example, if U.S. is chosen in the Input menu, you see the characters that appear on a U.S. keyboard in the Keyboard Viewer.

- 5 To see the keyboard layout for a different country, choose its keyboard layout from the Input menu.

## Typing Special Characters and Symbols

Using the Mac OS X Character Palette, you can insert special characters, such as mathematical symbols, letters with accent marks, arrows and other “dingbats,” and more. You can also use this palette to enter Japanese, Traditional Chinese, Simplified Chinese, and Korean characters, as well as characters from other languages.

### To insert special characters or symbols:

- 1 Place the insertion point where you want the special character or symbol to appear.
- 2 Choose Edit > Special Characters to open the Character Palette (or choose Characters from the Action pop-up menu in the lower-left corner of the Font panel).
- 3 Choose the type of characters you want to see from the View pop-up menu at the top of the Character Palette. If you don't see the View menu, click the button in the upper-right corner of the window to show the top portion of the window. Click this button again to hide the top portion of the window.
- 4 Click an item in the list on the left to see the characters that are available in each category.
- 5 Double-click the character or symbol on the right that you want to insert into your spreadsheet, or select the character and click Insert.

If the character or symbol has variations, they appear at the bottom of the window when you click the Character Info triangle or Font Variation triangle at the bottom of the palette. Double-click one to insert it in your spreadsheet.

If the character doesn't appear in your spreadsheet, Numbers may not support that character.

## Using Smart Quotes

Smart quotes are opening and closing quotation marks that are curly; the opening quotation marks are different from the closing quotation marks. When you don't use smart quotes, the marks are straight and the opening and closing marks don't differ.

“ ” — Smart quotes

” ” — Straight quotes

### To use smart quotes:

- Choose Numbers > Preferences, click Auto-Correction, and then select “Use smart quotes.”

## Using Advanced Typography Features

Some fonts, such as Zapfino and Hoefler, have advanced typography features, which let you create different effects. If you are using a font in a text box that has different typography effects available, you can change many of the effects in the Font submenu of the Format menu. For example, you may be able to adjust the following:

- *Kern*: Place characters closer together or farther apart.
- *Ligature*: Use or leave out stylish flourishes between letters or at the end or beginning of lines that combine two or more text characters into one glyph.

fi fl— Ligature not used

fi fl— Ligature used

In the Ligature submenu, choose Use Default to use ligature settings specified in the Typography window for the font you're using, choose Use None to turn off ligatures for selected text, or choose Use All to turn on additional ligatures for the selected text.

- *Baseline*: Move text higher or lower than the text around it.
- *Capitalization*: Convert characters to all capital letters, small capital letters, or initial capital letters (title style).

Advanced typography features are available in the Typography window.

### To open the Typography window:

- 1 Click Fonts in the toolbar.
- 2 In the Font panel, choose Typography from the Action pop-up menu (in the lower-left corner).

## Adjusting Font Smoothing

If the fonts on your screen look fuzzy, blurry, or jagged, you may want to adjust the font smoothing style or change the text size at which Mac OS X starts to smooth fonts.

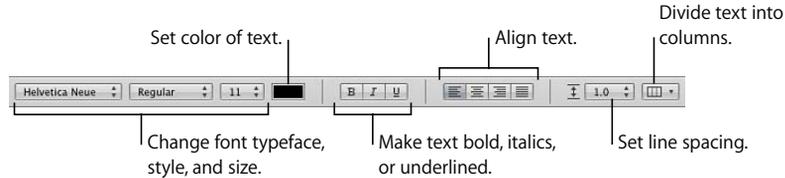
### To smooth the fonts on your screen:

- 1 Open System Preferences and click Appearance.
- 2 Choose a font smoothing style from the pop-up menu at the bottom. Depending on the type of display you have, you may notice only small or no differences between smoothing styles.
- 3 If you plan to use small font sizes in your spreadsheet, choose a point size from the "Turn off text smoothing for font sizes" pop-up menu. When text smoothing (or "antialiasing") is on, smaller fonts can be harder to read.

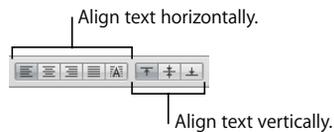
## Setting Text Alignment, Spacing, and Color

The primary tools for adjusting alignment, spacing, and color are the Format Bar and the Text Inspector. You can make some horizontal alignment adjustments (such as centering text or aligning it on the left) by using the Format menu.

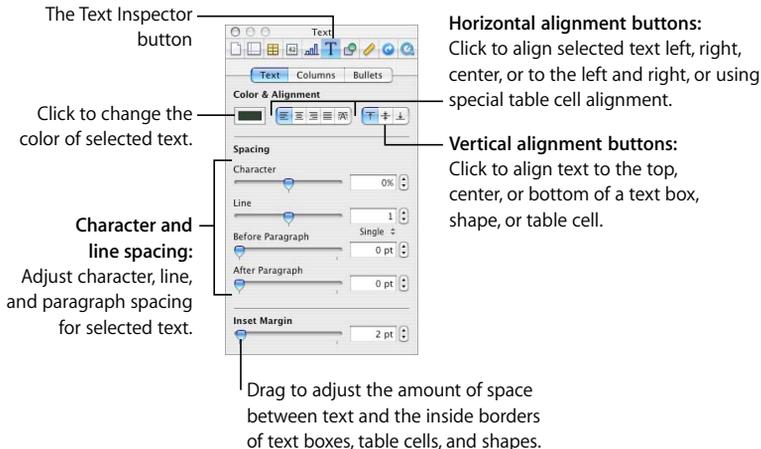
Color, spacing, and alignment controls are also available on the Format Bar when text is selected. When text in a text box, comment, or shape is selected, you can set the color of text, align text, and set line spacing.



When you're working with text in a table cell, you can use the Format Bar to align text both horizontally and vertically in the cell.



The Text pane of the Text Inspector gives you access to more alignment and line spacing settings.



### To open the Text pane of the Text Inspector:

- Click Inspector in the toolbar, click the Text Inspector button, and then click Text.

## Aligning Text Horizontally

You can change the alignment of text in a column, table cell, text box, or shape so that text is aligned to the left or right border, centered, or aligned on both left and right (justified).

### To align text left, center, right, or justified:

- 1 Select the text you want to change.
- 2 Click Inspector in the toolbar, click the Text Inspector button, and then click Text.
- 3 Click one of the five horizontal alignment buttons, located to the right of the color well. From left to right, these buttons have the following effects.

The Align Left button places each line of text against the left margin of the object.

The Center button sets the center of each line of text at the center of the object.

The Align Right button sets each line of text against the right margin of the object.

The Justify button spaces characters in each line so that the lines reach both the left and right margins of the object.

The Auto Align Table Cell button left justifies text and right justifies numbers in a table cell.

The five horizontal alignment buttons are also available on the Format Bar when a table cell is selected. The first four are available on the Format Bar when text in a text box, shape, or comment is selected.

You can also align text horizontally by choosing Format > Text > *Align Left, Center, Align Right, Justify, Auto Align Table Cell*.

If you want to indent the first line of text in a paragraph, or learn how to undo paragraph indenting, see “Setting Indents” on page 136.

## Aligning Text Vertically

You can change the alignment of paragraphs in a table cell, text box, or shape so that text is aligned to the top or bottom border or centered between them.

### To align text to the top, center, or bottom of a text box, table cell, or shape:

- 1 Select the text box, table cell, or shape whose alignment you want to change.
- 2 Click Inspector in the toolbar, click the Text Inspector button, and then click Text.
- 3 Click one of the three vertical alignment buttons, located below Color & Alignment, to align text to the top, middle, or bottom of the table cell, text box, or shape.

The vertical alignment buttons are also available on the Format Bar when you're working with a table cell.

## Adjusting the Spacing Between Lines of Text

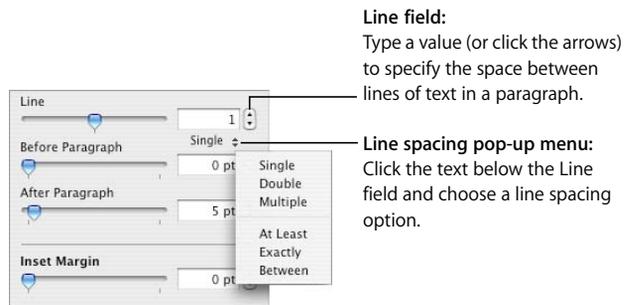
You can increase or decrease the distance between lines of text.

### To adjust spacing:

- 1 Select the text you want to change.
- 2 Click Inspector in the toolbar, click the Text Inspector button, and then click Text.
- 3 Move the Line slider left to decrease spacing or right to increase it.

To specify a precise line spacing value, type a point value in the Line field, or click the Up Arrow or Down Arrow next to the field.

- 4 Choose a line spacing option from the Line spacing pop-up menu that appears when you click the text below the line field.



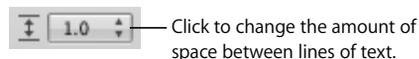
*Standard line spacing (Single, Double, Multiple):* The space between lines is proportional to font size. Use this when the relative distance between ascenders (parts of letters that extend to the top of the line) and descenders (parts of letters that extend below the line) should remain fixed. Single sets line spacing to single-spaced, and Double sets it to double-spaced. Multiple lets you set line spacing values lower than single, between single and double, or greater than double.

*At Least:* The distance from one line to the next will never be less than the value you set, but it may be larger for larger fonts in order to prevent overlapping text lines. Use this when the distance between lines should remain fixed, but overlap is not desired if the text gets large.

*Exactly:* The distance between the baselines.

*Between:* The value you set increases the space between the lines, instead of increasing the height of the lines. By contrast, double-spacing doubles the height of each line.

Line spacing can also be controlled by using the Line Spacing pop-up menu on the Format Bar when text is selected in a text box, shape, or comment.



## Adjusting the Spacing Before or After a Paragraph

You can increase or decrease the spacing before or after paragraphs.

### To adjust the amount of space before or after a paragraph:

- 1 Select the paragraphs you want to change.
- 2 Click Inspector in the toolbar, click the Text Inspector button, and then click Text.
- 3 Drag the Before Paragraph or After Paragraph slider. You can also specify a precise value (5 pt, for example) in the text boxes.

If the Before Paragraph or After Paragraph values for adjacent paragraphs aren't equal, the higher spacing value will be used. For example, if the current paragraph's Before Paragraph value is 12 points and the paragraph preceding it has an After Paragraph value of 14 points, the spacing between paragraphs will be 14 points.

Spacing before a paragraph does not appear if the paragraph is the first paragraph in a text box, shape, or table cell.

To set spacing around text in boxes, shapes, and table cells, use the Inset Margin control, described in "Changing the Inset Margin of Text in Objects" on page 136.

## Adjusting the Spacing Between Characters

You can increase or decrease the amount of space between characters.

### To adjust the amount of space between characters:

- 1 Select the text you want to change, or click where you want to type new text.
- 2 Click Inspector in the toolbar, click the Text Inspector button, and then click Text.
- 3 Drag the Character slider or specify a new percentage in the Character field.

You can also adjust the space between selected characters by choosing Format > Font > Kern and choosing an option from the submenu.

## Changing Text Color

You can change text color by using the Format Bar, the Text Inspector, and the Font panel. Changes you make with any of these tools overrides color changes already made with the other tools.

Before changing text color, select the text whose color you want to change, or click in the text to set the insertion point.

### Here are ways to change text color:

- Click the Text Color color well in the Format Bar. In the color matrix that appears, select a color by clicking it or click Show Colors to open the Colors window for additional color options.



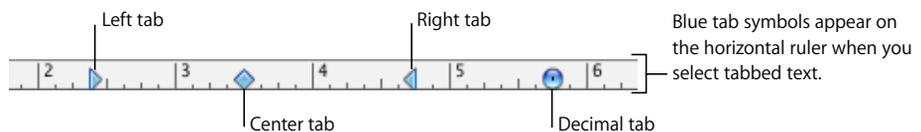
- Click Inspector in the toolbar, click the Text Inspector button, click Text, and then click the color well. The Colors window opens.

“Using the Colors Window” on page 161 provides instructions for using the Colors window.

## Setting Tab Stops to Align Text

You can align text at specific points by setting tab stops in a text box, table cell, or shape. When you press the Tab key (or Option-Tab when you’re working in a table cell), the insertion point (and any text to the right of it) moves to the next tab stop, and text you type starts at that point.

You can work with tab stop settings by manipulating the tab symbols on the horizontal rulers. You can see symbols for existing tab stops on the horizontal ruler when you click View in the toolbar, choose Show Rulers, and then select some text on a page.



To set tab stops in lists, see “Using Bulleted, Numbered, and Ordered Lists (Outlines)” on page 137 for information about indenting items in lists.

### Here are ways to work with rulers:

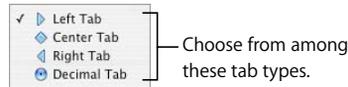
- To show or hide rulers, click View in the toolbar and choose Show Rulers or Hide Rulers.
- To change the units of measure in the rulers, choose Numbers > Preferences, click Rulers, and choose an item from the Ruler Units pop-up menu.

## Setting a New Tab Stop

You use the horizontal ruler to add a new tab stop.

### To create a new tab stop:

- 1 Click View in the toolbar and choose Show Rulers.
- 2 Click the horizontal ruler to place a tab symbol where you want to set the tab stop.
- 3 Control-click the tab symbol and choose an option from the shortcut menu.



*Left Tab:* Aligns the left side of text with the tab stop.

*Center Tab:* Places the center of text at the tab stop.

*Right Tab:* Aligns the right side of text with the tab stop.

*Decimal Tab:* For numbers, aligns the decimal character (such as a period or comma) with the tab stop.

You can also double-click the tab symbol repeatedly until the type of tab you want appears.

## Changing a Tab Stop

You can change the location and type of tab stops using the horizontal ruler.

### To change tab stops:

- 1 Click View in the toolbar and choose Show Rulers.
- 2 To move a tab stop, drag its blue tab symbol in the horizontal ruler.
- 3 To change the tab to a different type, Control-click the tab symbol and choose an option from the shortcut menu. Or double-click the tab symbol in the ruler repeatedly until the type of tab you want appears.

## Deleting a Tab Stop

You can quickly remove a tab stop using the horizontal ruler.

### To delete a tab stop:

- 1 Click View in the toolbar and choose Show Rulers.
- 2 Drag the tab symbol off the horizontal ruler.

## Setting Indents

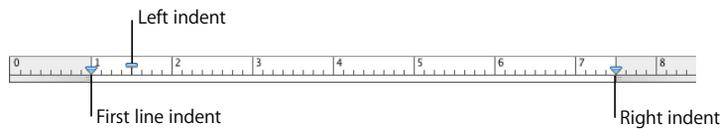
You can modify the amount of space between text and the inside border of a text box, shape, table cell, or comment.

### Setting Indents for Paragraphs

You can change indentation by dragging the indentation controls on the text ruler.

**To set indents using the rulers:**

- 1 Click View in the toolbar, and then choose Show Rulers.
- 2 To change the right indent, drag the right indent symbol (downward blue triangle on the right side of the horizontal ruler) to the position where you want the right edge of the paragraph to end.



- 3 To change the left indent, drag the left indent symbol (downward blue triangle on the left side of the ruler) to where you want the left edge of the paragraph to begin.  
To change the left margin independently from the left indent, hold down the Option key as you drag.
- 4 To change the first line indent, drag the first line indent (blue rectangle) to where you want the first line to start.

If you want the first line to remain flush with the left margin, make sure the rectangle aligns with the left indent symbol.

If you want to create a hanging indent, drag the rectangle to the left of the left indent symbol.

To use the ruler settings elsewhere in your spreadsheet, choose Format > Text > Copy Ruler and Format > Text > Paste Ruler.

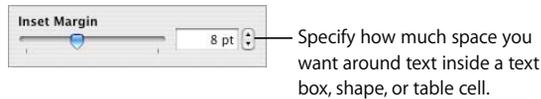
### Changing the Inset Margin of Text in Objects

You can change the amount of space between text and the inside border of a text box, shape, or table cell. This measurement is called the *inset margin*. The amount of space you specify is applied equally around the text on all sides.

**To set the spacing between text and the inside border of its object:**

- 1 If there's no insertion point in the object, select the object.
- 2 Click Inspector in the toolbar, click the Text Inspector button, and then click Text.

- 3 Drag the Inset Margin slider to the right to increase the space between text and the inside border of the object, or type a number in the Inset Margin box and press Return. You can also click the arrows to increase and decrease space.



## Setting Indents for Lists

To manage the indentation of bullets, numbers, and text that accompanies them in bulleted lists, numbered lists, and ordered lists, you use the Text Inspector. See “Using Bulleted, Numbered, and Ordered Lists (Outlines)” for details.

## Using Bulleted, Numbered, and Ordered Lists (Outlines)

Numbers provides pre-formatted bullet and numbering styles for creating simple or ordered lists (outlines). Bulleted and numbered lists are simple lists without the nested hierarchies of information like those you would see in an outline.

## Generating Lists Automatically

When you use automatic list generation, Numbers automatically formats a list for you based on what you type. To use this feature, first choose Numbers > Preferences, click Auto-Correction, and make sure that “Automatically detect lists” is selected.

### Here are ways to automatically generate lists:

- To create a bulleted list, press Option-8 to type a bullet (•), a space, and some text. Then press Return; if you’re working in a table cell and “Return key moves to next cell” is selected in the Table Inspector, press Option-Return instead.
- To create a list with labels that are asterisks (\*) or hyphens (-), type an asterisk or a hyphen, a space, and some text. Then press Return; if you’re working in a table cell and “Return key moves to next cell” is selected in the Table Inspector, press Option-Return instead.
- To create a list with labels that are numbers, letters, or Roman numerals, type the number, letter, or Roman numeral; a period; a space; and some text. Then press Return; if you’re working in a table cell and “Return key moves to next cell” is selected in the Table Inspector, press Option-Return instead.

You can use any of the character formats on the numbering style pop-up menu in the Text Inspector. To access this menu, in the Text Inspector click Bullets and choose Numbers from the Bullets & Numbering pop-up menu.

- To end your list, press Return twice. If you’re working in a table cell and “Return key moves to next cell” is selected in the Table Inspector, press Option-Return instead.

## Using Bulleted Lists

Although you can use automatic list generation to create a simple bulleted list, using the Text Inspector gives you many options for formatting bulleted lists. See “Generating Lists Automatically” on page 137 for information about automatic list generation.

### To add and format a bulleted list using the Text Inspector:

- 1 Place the insertion point where you want the list to begin.
- 2 Click Inspector in the toolbar, click the Text Inspector button, and then click Bullets.
- 3 Choose a bullet style from the Bullets & Numbering pop-up menu.

To use a typed character as a bullet, choose Text Bullets and choose a character from the list or type a new character in the field.

To use one of the image bullets that comes with Numbers, choose Image Bullets and choose an image from the scrolling list.

To use your own image as a bullet, choose Custom Image and choose an image in the Open dialog that appears.
- 4 To change the size of an image bullet, specify a percentage of the original image size in the Size field. Or, select the “Scale with text” checkbox and specify a percentage of the text size; this option maintains the image-to-text size ratio of the bullets even if you later change the font size of text.
- 5 To adjust the space between bullets and the left margin, use the Bullet Indent field. To adjust the space between bullets and text, use the Text Indent field.
- 6 To position bullets higher or lower relative to text in a text box or shape, use the Align field.

Use these techniques to add and indent bulleted items in your list:

- To add a new topic at the current indent level, press Return. If you’re working in a table cell and “Return key moves to next cell” is selected in the Table Inspector, press Option-Return instead.
- To create an unbulleted paragraph within a topic, press Return while holding down the Shift key. If you’re working in a table cell and “Return key moves to next cell” is selected in the Table Inspector, press Control-Return instead.
- To enter a new topic at the next lower indent level, press Tab. To enter a new topic at the next higher level, press Shift-Tab. You can also click and hold a bullet, and then drag to the right, to the left, down and to the right, or down and to the left.

If you’re working in a table cell and “Return key moves to next cell” is selected in the Table Inspector, use the Indent Level controls in the Bullets pane of the Text Inspector to change the level of entries.

- To return to regular text at the end of your list, press Return and choose No Bullets from the Bullets & Numbering pop-up menu. You may also need to adjust the indent level.  
If you're working in a table cell and "Return key moves to next cell" is selected in the Table Inspector, press Option-Return instead of Return.

## Using Numbered Lists

Although you can use automatic list generation to create a simple numbered list, using the Text Inspector gives you many options for formatting numbered lists. See "Generating Lists Automatically" on page 137 for information about automatic list generation.

### To add and format a numbered list:

- 1 Place the insertion point where you want the list to begin.
- 2 Click Inspector in the toolbar, click the Text Inspector button, and then click Bullets.
- 3 Choose Numbers from the Bullets & Numbering pop-up menu, and then choose a numbering style from the pop-up menu directly below it.
- 4 To adjust the space between numbers and the left margin, use the Number Indent field. To adjust the space between numbers and text, use the Text Indent field.

Use these techniques to add and indent items in your list:

- To add a new topic at the current indent level, press Return. If you're working in a table cell and "Return key moves to next cell" is selected in the Table Inspector, press Option-Return instead.
- To create an unnumbered paragraph within a topic, press Return while holding down the Shift key. If you're working in a table cell and "Return key moves to next cell" is selected in the Table Inspector, press Control-Return instead.
- To enter a new topic at the next lower indent level, press Tab. To enter a new topic at the next higher level, press Shift-Tab. You can also click and hold a number, and then drag to the right, to the left, down and to the right, or down and to the left.  
If you're working in a table cell and "Return key moves to next cell" is selected in the Table Inspector, use the Indent Level controls in the Bullets pane of the Text Inspector to change the level of entries.
- To return to regular text at the end of your list, press Return and choose No Bullets from the Bullets & Numbering pop-up menu. You may also need to adjust the indent level.  
If you're working in a table cell and "Return key moves to next cell" is selected in the Table Inspector, press Option-Return instead of Return.
- To add an existing paragraph to a numbered list, click the paragraph, choose a numbering style, and click "Continue from previous."

- To start a new numbered sequence in a list, click “Start at” and specify the number you want the sequence to begin with.

If you want items in your list to have labeled subtopics (like in an outline), use an ordered list instead of a numbered list.

### Using Ordered Lists (Outlines)

Ordered lists (or outlines) provide different numbering styles for each indent level in a list, allowing you to create a hierarchy of information. For example:

- You can create an outline using a numbering sequence such as the following as you proceed from the highest level to lower levels: I, A, 1, a), (1), (a), i), (1), and (a).
- You can create a legal style outline, which appends an additional number or letter at each lower level: 1, 1.1, 1.1.1, and so on.

You can add and format ordered lists using the Text Inspector.

#### To add and format an ordered list:

- 1 Place the insertion point where you want the list to begin.
- 2 Click Inspector in the toolbar, click the Text Inspector button, and then click Bullets.
- 3 To create a legal style list, choose Tiered Numbers from the Bullets & Numbering pop-up menu. Otherwise, choose Numbers instead.
- 4 Choose a numbering style from the pop-up menu directly below it.
- 5 To adjust the space between numbers and the left margin, use the Number Indent field. To adjust the space between numbers and text, use the Text Indent field.

Use these techniques to add and indent items in your list:

- To add a new topic at the current indent level, press Return. If you’re working in a table cell and “Return key moves to next cell” is selected in the Table Inspector, press Option-Return instead.
- To create an unnumbered paragraph within a topic, press Return while holding down the Shift key. If you’re working in a table cell and “Return key moves to next cell” is selected in the Table Inspector, press Control-Return instead.
- To enter a new topic at the next lower indent level, press Tab. To enter a new topic at the next higher level, press Shift-Tab. To move among levels you can also click and hold a number, and then drag to the right, to the left, down and to the right, or down and to the left.

If you’re working in a table cell and “Return key moves to next cell” is selected in the Table Inspector, use the Indent Level controls in the Bullets pane of the Text Inspector to change the level of entries.

- To return to regular text at the end of your list, press Return and choose No Bullets from the Bullets & Numbering pop-up menu. You may also need to adjust the indent level.  
If you're working in a table cell and "Return key moves to next cell" is selected in the Table Inspector, press Option-Return instead of Return.
- To add an existing paragraph to a numbered list, click the paragraph, choose a numbering style, and then click "Continue from previous."
- To start a new numbered sequence in a list, click "Start at" and specify the number you want the sequence to begin with.

## Using Text Boxes and Shapes to Highlight Text

Use text boxes and shapes to make text stand out.

### Adding Text Boxes

You can add a text box to a sheet and drag it to position it.

#### To create a text box:

- 1 Click Text Box in the toolbar (or choose Insert > Text Box).
- 2 In the text box that appears, double-click the text and type.  
Text boxes automatically grow or shrink to accommodate the length of your text.
- 3 When you've finished typing, click outside the text box. Or, to stop editing text and select the text box, press Command-Return.
- 4 Drag the handles on the text box to change its width.
- 5 Drag the text box to position it on the sheet.

You can't make a text box taller by dragging up or down. However, you can force the box to grow vertically by dragging the selection handles inward to make the box narrower.

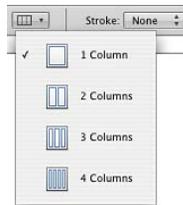
You can also draw a text box. Option-click Text Box in the toolbar, and drag the pointer across the spreadsheet window to create a text box that's the size you want.

For more information about modifying text boxes, see "Formatting a Text Box or Shape" on page 143.

### Presenting Text in Columns

You can organize text in a text box or a rectangular shape into columns. When text has filled one column, it flows into the next column.

Use the Columns pop-up menu in the Format Bar to quickly divide text into 1 through 4 columns in a selected text box or rectangular shape.



For more options, use the Text Inspector.

### To create and format columns using the Text Inspector:

- 1 Select the text box or rectangular shape with text you want to divide into columns.
- 2 Click Inspector in the toolbar, click the Text Inspector button, and then click Columns.
- 3 To indicate how many columns you want, use the Columns field.
- 4 To use equal-width columns, select “Equal column width.”  
To set up different column widths, deselect “Equal column width,” double-click a Column value, and type a new width.
- 5 To change the distance between columns, double-click a Gutter value and change it.

## Putting Text Inside a Shape

All shapes, except lines, can contain text.

### To add text to a shape:

- 1 Place a shape where you want it on a sheet. To learn about adding shapes, see “Adding a Predrawn Shape” on page 164 and “Adding a Custom Shape” on page 164.
- 2 Double-click the shape and type the text you want. If the text extends beyond the border of the shape, a clipping indicator appears.



The clipping indicator shows that text extends beyond the borders of a shape.

- 3 To resize the shape, select it and drag the selection handles. (If the insertion point is inside the shape, press Command-Return to get out of text editing mode and select the shape.)

You can format the text within a shape. You can also rotate a shape while keeping its text horizontal. After rotating the shape choose Format > Shape > Reset Text and Object Handles.

- 4 To add text to a shape that's part of a group, double-click in the text area of any shape in the group. If you resize the group, everything resizes except for the text. Of course, you can still select text and change its font size.

See "Grouping and Locking Objects" on page 159 for details about grouping objects.

## Formatting a Text Box or Shape

You can change the amount of space between text and the inside border of a text box, shape, or table cell. See "Changing the Inset Margin of Text in Objects" on page 136 for instructions.

Use the Format Bar and Graphic Inspector to format borders, shadows, opacity, color fill, and more for text boxes or shapes. For more information about setting object properties, see "Modifying Objects" on page 154 and "Filling Objects" on page 160.

## Using Hyperlinks

Hyperlinks are used in spreadsheets that will be viewed onscreen, either as HTML files or as Numbers spreadsheets. You can add hyperlinks to open an email message or a webpage on the Internet.

Use this type of hyperlink	To go to	Notes
Webpage	A page in a web browser	Provide the URL of the page you want to open.
Email Message	A new mail message with the specified subject and addressee	Type the address of the email recipient and a subject line.

## Linking to a Webpage

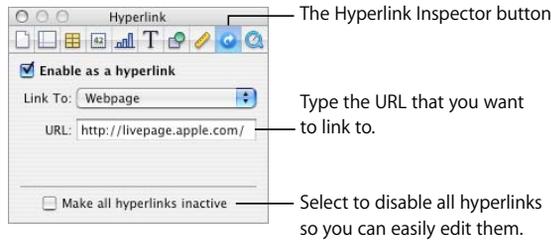
You can add a hyperlink that opens a webpage in your default web browser.

### To add hypertext that opens a webpage:

- 1 Select the text that you want to turn into a hyperlink.

If you use text that starts with "www" or "http," the text automatically becomes a hyperlink. To turn off this feature, choose Numbers > Preferences, click Auto-Correction, and deselect "Automatically detect email and web addresses." This setting is computer-specific, so if the spreadsheet is opened on a computer with a different setting, that computer's setting is used instead.
- 2 Click Inspector in the toolbar, click the Hyperlink Inspector button, and then select "Enable as a hyperlink."
- 3 Choose Webpage from the Link To pop-up menu.

- 4 Type the webpage's address in the URL field.



## Linking to a Preaddressed Email Message

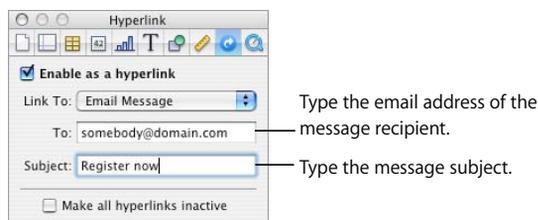
You can add a hyperlink that you can click to create a preaddressed email message in your default mail application.

### To add hypertext that links to an email message:

- 1 Select the text that you want to turn into a hyperlink.

If you include an email address in a spreadsheet, the text automatically becomes a hyperlink. To turn off this feature, choose Numbers > Preferences, click Auto-Correction, and then deselect "Automatically detect email and web addresses." This setting is computer-specific, so if the spreadsheet is opened on a computer with a different setting, that computer's setting is used instead.

- 2 Click Inspector in the toolbar, click the Hyperlink Inspector button, and then select "Enable as a hyperlink."
- 3 Choose Email Message from the Link To pop-up menu.
- 4 Type the email address of the intended recipient in the To field.
- 5 Optionally type a subject line in the Subject field.



## Editing Hyperlink Text

There are several ways to edit hyperlink text.

### Here are ways to edit hyperlink text:

- Make hyperlinks inactive, change the hyperlink text, then reactivate hyperlinks. Activate and deactivate hyperlinks by clicking Inspector in the toolbar, clicking the Hyperlink Inspector button, and then selecting "Make all hyperlinks inactive."

- Click outside the hyperlink text, and use the arrow keys to move the insertion point into the text.

## Inserting Page Numbers and Other Changeable Values

You can insert such values as page numbers, page count, and date and time in a spreadsheet by using formatted text fields, which are automatically updated by Numbers when they change. Although values such as these are common in headers and footers (see “Using Headers and Footers” on page 41), you can insert formatted text fields anywhere in your spreadsheet.

### Here are ways to insert formatted text fields:

- To add page numbers, place the insertion point where you want the page number to appear, and then choose Insert > Page Number.  
To change the page number format, Control-click a page number and choose a new number format.
- To add the total page count, place the insertion point where you want the page count to appear, and then choose Insert > Page Count.  
To include the total page count with each page number, such as “2 of 10,” add a page number, type “of,” and then choose Insert > Page Count.  
To change the page count format, Control-click a page count and choose a new number format.
- To add and format the date and/or time, place the insertion point where you want the value to appear, and then choose Insert > Date & Time.  
To change the date and time format, Control-click the date and time value, choose Edit Date & Time, and then choose a date and time format from the pop-up menu. If you want the spreadsheet to always show the current date and time, select “Automatically update on open.”

## Automatically Substituting Text

Numbers can be set to recognize and replace text you don’t want with text you do want. For example, when you type “teh,” Numbers can automatically change it to “the.”

### To set up automatic text substitution:

- 1 Choose Numbers > Preferences.
- 2 Click Auto-Correction and make settings as desired.

To automatically convert single and double quotation marks to smart quotes so that opening and closing quotation marks are not identical, select “Use smart quotes.”

To make sure that the first word in a sentence begins with a capital letter, select “Fix capitalization.”

To automatically convert the letters in “1st,” “2nd,” “3rd,” and so on into superscripts, select “Superscript numerical suffixes.”

To set Numbers to automatically detect that something you’ve typed is an email address or a URL, select “Automatically detect email and web addresses.” Email and web addresses you type automatically become hyperlinks for Mail or Safari.

To use automatic list generation, select “Automatically detect lists.”

To replace one or more characters with one or more different characters, select “Symbol and text substitution.” Then use the rows in the table to define and activate specific substitutions. For example, when you type (c), you can have Numbers automatically convert it to © by putting a checkmark in the On column. To add a row to the table to define your own substitution, click the Add (+) button. To remove a selected item, click the Delete (–) button.

After you specify substitution settings, they’ll apply to any text you change or add in any Numbers spreadsheets.

## Inserting a Nonbreaking Space

You can insert a nonbreaking space between words to make sure that the words always appear in the same line of text.

**To insert a nonbreaking space:**

- Press the Space bar while holding down the Option key.

## Checking for Spelling Mistakes

Numbers can catch spelling errors in your spreadsheet and help you find alternative spellings for misspelled words.

### Finding Misspelled Words

You can set the spell checker to flag spelling errors as you type, or you can check your entire spreadsheet or selected text at any time.

Misspelled words appear with a red dashed line below them.

**Here are ways to find misspelled words:**

- To check spelling as you type, choose Edit > Spelling > Check Spelling as You Type. To turn off spell checking as you type, click Edit > Spelling > Check Spelling as You Type to deselect it (make sure the checkmark is not visible next to the menu command).
- To check spelling from the insertion point to the end of the spreadsheet, click to place the insertion point and choose Edit > Spelling > Check Spelling. To limit spell checking to a specific part of the spreadsheet, select the text you want to check before choosing the command.

The first misspelled word found is highlighted. You can correct it or choose the same menu command again to continue checking the spreadsheet.

To go through the text more quickly, press Command-semicolon (;) to continue checking the spreadsheet.

- To check spelling *and* view suggestions for misspelled words, choose Edit > Spelling > Spelling.

The Spelling window opens, and you can use it as “Working with Spelling Suggestions” describes.

## Working with Spelling Suggestions

Use the Spelling window to work with alternative spellings.

### To work with spelling suggestions:

- 1 Choose Edit > Spelling > Spelling.  
The Spelling window opens and the first misspelled word is highlighted.
- 2 Make sure that the correct language is selected in the Dictionary pop-up menu. Each language uses a different spelling dictionary.
- 3 To replace the incorrect spelling in the text, double-click the correct word or spelling in the Guess list.
- 4 If the correct word doesn’t appear in the Guess list but you know the correct spelling, select the misspelled word in the Spelling window, type the correct word, and click Correct.
- 5 If the current spelling is correct and you want to leave it as it is, click Ignore or Learn. Use Learn if the term is one you use often and you want to add the term to the spelling dictionary.  
If you used Learn and later decide you don’t want the word in the dictionary, type the word into the text field below the Guess list, and then click Forget.
- 6 If no alternate spellings appear in the Guess list, select the misspelled word in the Spelling window and try a different spelling. Click Guess to see whether new possibilities appear in the Guess list.
- 7 Click Find Next and repeat steps 3 through 6 until you find no more spelling errors.

You can also hold down the Control key and click a misspelled word. From the pop-up menu you can choose an optional alternative spelling, click Learn, or click Ignore.

## Finding and Replacing Text

You can find every instance of a word or phrase in your spreadsheet, and optionally change it to something else.

### Here are ways to find and replace text:

- Choose Edit > Find > Find, click Simple or Advanced to set up find/replace criteria, and then click a button to conduct find/replace operations.

*Simple:* In the Find field, type the text you want to find, and type any text you want to replace it with in the Replace field.

*Advanced:* In addition to typing Find and Replace text, you can set up additional find/replace criteria. Use the help tags to understand the fields that appear.

*Replace All:* Automatically conducts the find/replace operation without your review.

*Replace:* Replaces the current selection with the replacement text.

*Replace & Find:* Replaces the current selection with the replacement text and immediately finds the next occurrence of the Find text.

*Next or Previous:* Finds the next or previous occurrence of the Find text without replacing it, starting with the current sheet or selected cell(s) and searching forward or backward through the spreadsheet.

- Use the other commands on the Edit > Find submenu.

*Find Next or Find Previous:* Finds the next or previous occurrence of the current Find text without replacing it, starting with the current sheet or selected cell(s) and proceeding forward or backward through the spreadsheet.

*Use Selection for Find:* Finds the next occurrence of the selected text.

*Jump to Selection:* Displays the selected text when it's not currently in view.

This chapter describes techniques for adding and modifying images, shapes, sound, and other objects.

An object is an item you can add to a spreadsheet and then manipulate. Images, shapes, movies, sound files, tables, charts, and text boxes are all objects.

Images include photographs or PDF files. Movies and sound are for spreadsheets that will be viewed onscreen. Shapes include simple predrawn shapes (such as triangles and arrows) and custom shapes that you draw yourself. Text boxes hold text.

## Selecting Objects

Before you can move, modify, or perform other operations on objects, you must select them. A selected object has handles that let you move or manipulate the object.

**Here are ways to select and deselect objects:**

- To select a single object, click anywhere on the object (to select an object that has no fill, click the edge).
- To select several objects, hold down the Shift key as you click objects.
- To select all the objects in a sheet, select the sheet and press Command-A or choose Edit > Select All.
- To select an object that's part of a group, you must first ungroup the objects. Select the group, and then choose Arrange > Ungroup.
- To deselect objects in a group of selected objects, hold down the Command key, and then click objects you want to deselect.

## Copying or Duplicating Objects

The technique you use to copy an object depends on where you want to place the copy. When the copy will be far from the original or in another sheet or spreadsheet, copying and pasting is generally easier. When you're working with an object that is near the original, duplicating is generally easier.

### Here are ways to copy objects:

- To copy and paste an object, select it, and then choose Edit > Copy. Click the sheet in which you want the copy to appear. Choose Edit > Paste.
- To copy an object within the same sheet, you can hold down the Option key while you drag the object.

You can also duplicate the object. Select the object and choose Edit > Duplicate. The copy appears on top of the original, slightly offset. Drag the copy to the desired location.

- To copy an image between Numbers spreadsheets, select the image and drag its icon from the File Info field in the Metrics Inspector to a sheet in the other Numbers file. You can also use Edit > Copy and Edit > Paste.

## Deleting Objects

Deleting objects is quick and easy.

### To delete objects:

- Select the object(s) and press the Delete key.

If you accidentally delete an object, choose Edit > Undo Delete.

## Moving Objects

You can drag objects or cut and paste them to move them.

### Here are ways to move objects:

- Click the object to select it (the selection handles appear), and then drag it to a new location.
- To constrain the object's motion to horizontal, vertical, or a 45 degree angle, start dragging the object while holding down the Shift key.
- To move the object in small increments, press one of the arrow keys, causing the object to move a point at a time. To move the object ten points at a time, hold down the Shift key while pressing an arrow key.
- To show the position of the object when you move it, choose Numbers > Preferences, and then select "Show size and position when moving objects" in the General pane.

- To precisely align objects by their edges or centers, you can use alignment guides. See “Using Alignment Guides” on page 152 for details.
- Select the object and choose Edit > Cut. Place the insertion point where you want the object to appear, and then choose Edit > Paste.

Avoid dragging an object by the selection handles because you may inadvertently resize the object.

## Moving an Object Forward or Backward

When objects overlap or when text and objects overlap, you can change the order of objects in the stack.

**To move an object in front or in back of text or another object:**

- 1 Select the object you want to move.
- 2 To move an object a layer at a time, choose Arrange > Bring Forward or Arrange > Send Backward.
- 3 To move an object to the very top or bottom of the stack, choose Arrange > Bring to Front or Arrange > Send to Back.

If you frequently layer objects, you can add the Front, Back, Forward, and Backward buttons to the toolbar to work more efficiently. To learn about customizing the toolbar, see “The Toolbar” on page 24.

## Aligning Objects

There are various ways to align objects.

### Aligning Objects Relative to Each Other

You can quickly align objects relative to one another if they appear on the same page.

**To align objects:**

- 1 Select the objects you want to align.
- 2 Choose Arrange > Align Objects, and then choose one of the alignment options in the submenu.

*Left:* Positions objects so that their left edges align vertically to the first object you select.

*Center:* Positions objects so that their centers align vertically to the first object you select.

*Right:* Positions objects so that their right edges align vertically to the first object you select.

*Top:* Positions objects so that their top edges align horizontally to the first object you select.

*Middle:* Moves objects vertically so that their centers align horizontally to the first object you select.

*Bottom:* Positions objects so that their bottom edges align horizontally to the first object you select.

You can also align objects relative to one another by dragging them and using alignment guides to determine when the objects are correctly positioned. See “Using Alignment Guides” for more information.

### Spacing Objects Evenly on a Page

You can quickly place an equal amount of space between objects, regardless of their size.

#### To space objects evenly:

- 1 Select the objects.
- 2 Choose Arrange > Distribute Objects, and then choose an option from the submenu.

*Horizontally:* Adjusts the horizontal spacing between objects.

*Vertically:* Adjusts the vertical spacing between objects.

### Using Alignment Guides

You can turn on alignment guides to help you align objects on a sheet.

Alignment guides will appear when the center or edge of an object aligns with the center or edge of another object, depending upon your preferences.

Alignment guides aren’t visible when you print your spreadsheet; they are visible only when you’re editing a spreadsheet.

#### To set up alignment guides:

- 1 Choose Numbers > Preferences, and then click General.
- 2 To show or hide guides when an object’s center aligns with another object, select or deselect “Show guides at object center.”
- 3 To show or hide guides when an object’s edges align with another object, select or deselect “Show guides at object edges.”
- 4 To change the color of alignment guides, click the color well and select a color in the Colors window.

Alignment guide settings apply to all spreadsheets viewed in Numbers until you change the settings again.

To temporarily hide alignment guides, hold down the Command key while you drag an object.

You can also create your own alignment guides to help you place objects.

## Creating New Alignment Guides

You can create your own alignment guides to help you place objects.

### To create an alignment guide:

- 1 If you're editing text in an object or if you're editing the content of a table cell, select an object or click the canvas.
- 2 Click View in the toolbar, and then choose Show Rulers.
- 3 Place the pointer over a ruler, click, and drag onto the page. An alignment guide appears.
- 4 Drag the guide where you want it on the page.

To remove an alignment guide that you've created, drag it off the edge of the page.

## Setting Precise Positions of Objects

You use the Metrics Inspector to precisely locate objects.

### To set the precise position of an object:

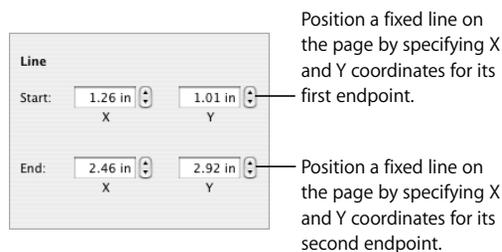
- 1 Select the object you want to position.
- 2 Click Inspector in the toolbar, and then click the Metrics Inspector button.
- 3 Enter X and Y values in the Position fields.

The specified coordinates determine the position of the upper-left corner of the object's container box.

- The X value is measured from the left edge of the layout.
- The Y value is measured from the top edge of the layout.

If an object is rotated, the X and Y coordinates specify the upper-left corner of the rotated container box.

When you enter X and Y coordinates for line positions in the Metrics Inspector, the Start coordinates represent the first endpoint you created. If you later flip or rotate the line, the Start coordinates continue to represent the first endpoint.



## Modifying Objects

You can resize objects, change their orientation, modify their border styles, add shadows and reflections to them, and adjust their opacity.

### Resizing Objects

You can resize an object by dragging its handles or typing exact dimensions.

#### Here are ways to resize objects:

- To resize an object by dragging, select the object and then drag one of its selection handles. To resize an object in one direction, drag a side handle instead of a corner handle.

To resize the object from its center, press the Option key as you drag.

To maintain an object's proportions, hold down the Shift key as you drag. You can also click Inspector in the toolbar, click the Metrics Inspector button, and then select "Constrain proportions" before dragging.

To show the size of an object when you drag a selection handle, choose Numbers > Preferences, and then select "Show size and position when moving objects" in the General pane.

- To resize an object using exact proportions, select the object, click Inspector in the toolbar, click the Metrics Inspector button, and then use the Width and Height controls.
- To resize several objects at once, select the objects, click Inspector in the toolbar, click the Metrics Inspector button, and then type new values in the Width and Height fields.
- Select the object, and then click Original Size in the Metrics Inspector.

### Flipping and Rotating Objects

You can flip or rotate any object. For example, if you have an image of an arrow that you want to use in your spreadsheet, but you need it to point in a different direction, you can reverse its direction vertically or horizontally, or point it at any angle.

#### Here are ways to change an object's orientation:

- To flip an object horizontally or vertically, select the object, and then choose Arrange > Flip Horizontally or Arrange > Flip Vertically.

You can also click Inspector in the toolbar, click the Metrics Inspector button, and then use the Flip buttons.

- To rotate an object, select the object, hold down the Command key and move the pointer toward a selection handle until it changes to a curved, double-headed arrow, and then drag a selection handle.

To rotate an object in 45-degree increments, press the Shift and Command keys while dragging a selection handle.

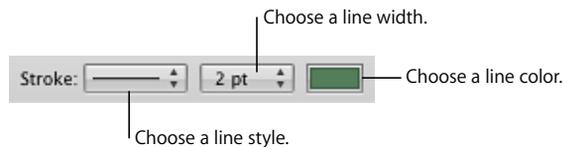
You can also click Inspector in the toolbar, click the Metrics Inspector button, and then drag the Rotate wheel or use the Angle controls to set the angle of the object.

- To rotate a shape but keep its text horizontal, after rotating the shape choose Format > Shape > Reset Text and Object Handles.

## Changing the Style of Borders

For shapes, chart elements, and text boxes, you can choose a line style and color for the object's border, or you can specify no border. You can also put a border around imported images.

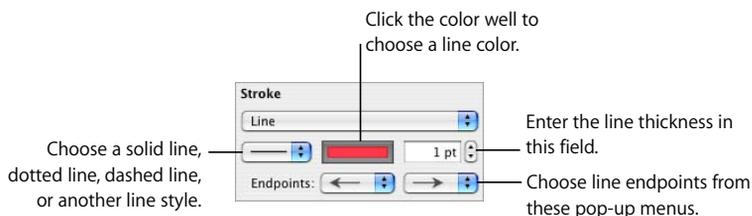
You can use the Format Bar to change the line style, line thickness, and line color of the border around one or more selected objects.



You can use the Graphic Inspector to make additional adjustments.

### To change the border style by using the Graphic Inspector:

- 1 Select the object(s) that you want to modify.
- 2 Click Inspector in the toolbar, and then click the Graphic Inspector button.
- 3 Choose Line from the Stroke pop-up menu.
- 4 Choose a line style from the pop-up menu.



- 5 To change the line thickness, type a value in the size field (or click the arrows).
- 6 To change the line color, click the color well and select a color.
- 7 To give a line endpoints, such as arrowheads or circles, choose left and right endpoints from the pop-up menus.

To change table and table cell borders, follow the instructions in "Formatting Table Cell Borders" on page 75.

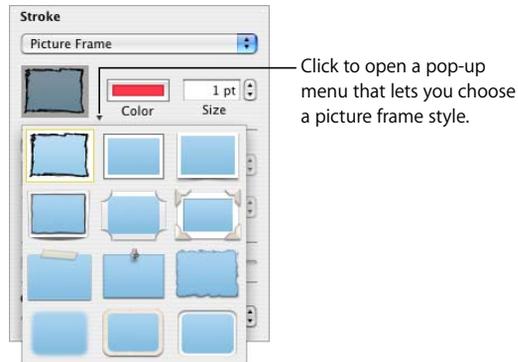
## Framing Objects

Enclose your images, shapes, text boxes, movies, and media placeholders with graphical borders, known as *picture frames*.

**Here are ways to work with picture frames:**

- To add a picture frame, select the object, click Inspector in the toolbar, and then click the Graphic Inspector button.

Choose Picture Frame from the Stroke pop-up menu, and then click the thumbnail to choose one. Click the Color well to choose a color for the picture frame.



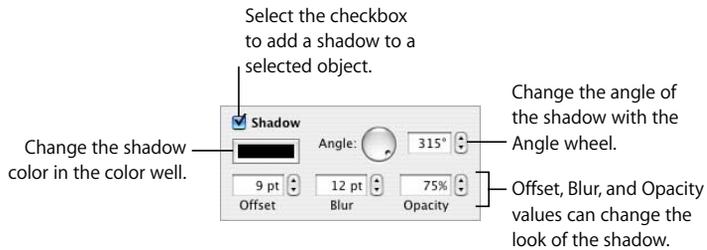
Some picture frames can be adjusted. To adjust your frame, use the Scale slider or type a specific percentage in the adjacent field.

- To change a picture frame, select a framed media or media placeholder, click Inspector in the toolbar, and then click the Graphic Inspector button. Choose Picture Frame from the Stroke pop-up menu, and then click the arrow next to the thumbnail to choose a new picture frame.
- To remove a picture frame from your media or media placeholder, select the media or media placeholder and then choose a line style (or None) from the Stroke pop-up menu.

## Adding Shadows

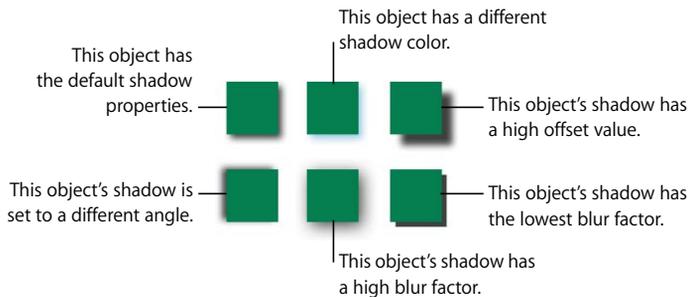
Shadows give your objects an appearance of depth. An object's shadow appears on any object behind it. You can create a variety of shadow effects, or remove the shadow from an object.

To quickly add or remove a shadow, you can select the object and then select or deselect Shadow in the Format Bar. The Graphic Inspector gives you more extensive control over shadow formatting.



### To add a shadow to an object using the Graphic Inspector:

- 1 Select the object.
- 2 Click Inspector in the toolbar, and then click the Graphic Inspector button.
- 3 Select Shadow to add a shadow to the object. Deselect Shadow to make a shadow go away.
- 4 Set the angle for the shadow using the Angle controls.
- 5 To set how far the shadow is from the object, use the Offset controls. A high shadow offset value makes an object's shadow appear longer and slightly separated from the object.
- 6 To adjust the softness of the shadow's edge, use the Blur controls. A high blur value makes the object's shadow appear more diffuse; a low value gives the shadow more sharply defined edges.
- 7 To change the shadow's transparency, use the Opacity controls. Don't use the Opacity slider at the bottom of the Graphic Inspector, which is for controlling the opacity of the object itself.
- 8 To change the color for the shadow, click the Shadow color well and select a color.



You can also use the Graphic Inspector shadow controls to add shadows to text. Select the text to which you want to add shadows, and use the controls as described above.

## Adding a Reflection

You can add a reflection to an object that reflects vertically downward.



You can add or remove a reflection by selecting an object and then selecting or deselecting Reflection in the Format Bar. Using the Graphic Inspector, you can also control the amount of reflection.

### To add a reflection to an object using the Graphic Inspector:

- 1 Select the object.
- 2 Click Inspector in the toolbar, and then click the Graphic Inspector button.
- 3 Select Reflection and drag the slider to increase or decrease the amount of reflection.

## Adjusting Opacity

You can create interesting effects by making objects more opaque or less opaque.

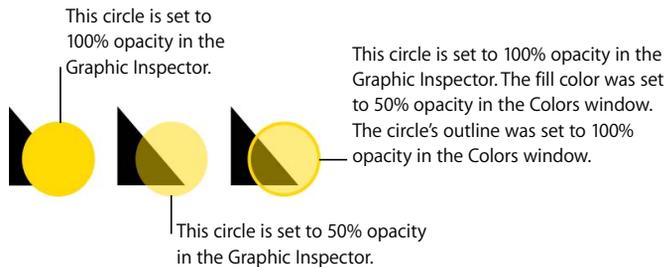
When you put a low-opacity object on top of another object, for example, the bottom object shows through the top object. Depending on how high or low you set the opacity, the objects below can be highly visible, partly obscured, or completely blocked from view (at 100-percent opacity).

### Here are ways to change a selected object's opacity:

- Use the Opacity pop-up menu in the Format Bar to choose an opacity percentage.
- For finer control, click Inspector in the toolbar, click the Graphic Inspector button, and drag the Opacity slider or enter a percentage in the adjacent field.



For shapes, you can set opacity for fill and stroke *colors* separately from *object* opacity. If you move the Opacity slider in the Colors window to modify a fill or stroke color, that opacity value becomes maximum object opacity. Then, when you change the object opacity in the Graphic Inspector, you are changing it *relative to* the opacity you set in the Colors window.



If you change an object's opacity and then can't restore the object's fill color to 100%, it may be because the opacity was set to less than 100% in the Colors window. To fix it, select the object, choose View > Show Colors, and then set the opacity in the Colors window to 100%.

## Grouping and Locking Objects

Group objects you want to keep together, and lock objects you don't want to inadvertently move.

### Grouping and Ungrouping Objects

You can group objects (except tables) together so that they can be moved, copied, resized, and oriented as a single object. You can edit text associated with a shape or text object in a group, but you can't modify other attributes of individual objects in the group.

#### To group objects:

- 1 Hold down the Command (or Shift) key as you select the objects you want to group. The objects can't be locked.
- 2 Choose Arrange > Group.

To ungroup a grouped object, select the group, and then choose Arrange > Ungroup. If the group is locked, unlock it first.

## Locking and Unlocking Objects

You can lock objects to avoid inadvertently moving them as you work.

After you lock individual or grouped objects, you can't move, delete, or modify them until you unlock them. A locked object can be selected, copied, or duplicated; when you copy or duplicate a locked object, the new object is also locked.

### To lock objects:

- 1 Hold down the Command (or Shift) key as you select the objects you want to lock.
- 2 Choose Arrange > Lock.

To unlock an object, select the object, and then choose Arrange > Unlock.

## Filling Objects

Fill an object with a solid color, a color gradient, or an image.

### Filling an Object with Color

Use the Format Bar to quickly add a fill color to a selected object. Click the Fill well and then choose a color from the color matrix or click Show Colors to open the Colors window for more choices. Use the Opacity control to adjust the degree of color transparency.

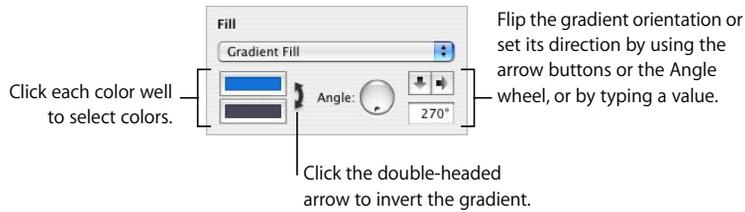
Use the Graphic Inspector to fill an object with a solid color or a color gradient, in which two colors gradually blend with each other.

### To change an object's fill color by using the Graphic Inspector:

- 1 Select the object.
- 2 Click Inspector in the toolbar, and then click the Graphic Inspector button.
- 3 To apply a solid fill color, choose Color Fill from the Fill pop-up menu. Click the color well below the Fill pop-up menu to open the Colors window, and then select a color in the Colors window.
- 4 To fill an object with a color gradient, choose Gradient Fill from the Fill pop-up menu. Click each color well and choose each color in the Colors window.

To set a direction for the gradient, use the Angle wheel or field. To flip it horizontally or vertically, click the Angle arrow buttons.

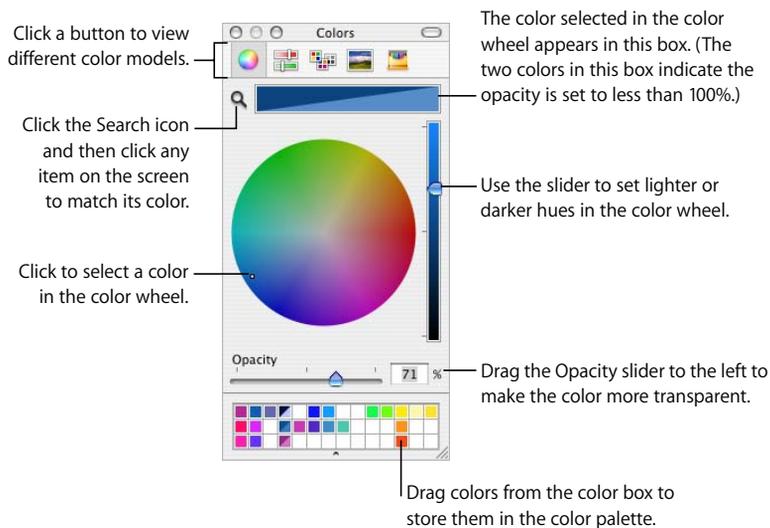
To invert the gradient, click the double-headed arrow next to the color wells.



Instructions for using the Colors Window follow.

## Using the Colors Window

You use the Colors window to select color for objects.



You can use the color wheel in the Colors window to select colors. The color you select appears in the box at the top of the Colors window. You can save that color for future use by placing it in the color palette.

To apply the colors you select in the Colors window to an object on the page, you must place the color in the appropriate color well in an Inspector pane. You can select a color well in one of the Inspectors, and then click a color in the color wheel. Or you can drag a color from the color palette or color box to a color well in one of the Inspectors.

### To select a color:

- 1 Open the Colors window by clicking Colors in the toolbar or clicking a color well in one of the inspectors.
- 2 Click anywhere in the color wheel. The selected color is displayed in the color box at the top of the Colors window.
- 3 To make the color lighter or darker, drag the slider on the right side of the Colors window.
- 4 To make the color more transparent, drag the Opacity slider to the left or enter a percentage value in the Opacity field.
- 5 To use the color palette, open it by dragging the handle at the bottom of the Colors window. Save a color in the palette by dragging a color from the color box to the color palette. To remove a color from the palette, drag a blank square to the color you want to remove.
- 6 To match the color of another item on the screen, click the magnifying glass to the left of the color box in the Colors window. Click the item on the screen whose color you want to match. The color appears in the color box. Select the item you want to color in the spreadsheet, and drag the color from the color box to the item.

## Filling an Object with an Image

You can fill a shape, text box, table, table cell, chart background, or chart series with an image.

### To fill an object with an image:

- 1 Select the object you want to fill with an image.
- 2 If the Graphic Inspector isn't open, click Inspector in the toolbar and click the Graphic Inspector button.
- 3 In the Graphic Inspector, choose Image Fill or Tinted Image Fill, and then choose an image.

You can also drag an image file from the Finder or Media Browser to the image well in the Graphic Inspector or directly to a table cell or chart series.



Use the pop-up menu to set the size of the image within the object.

To change the image, drag an image to the image well.

- 4 Choose an image scale from the pop-up menu.

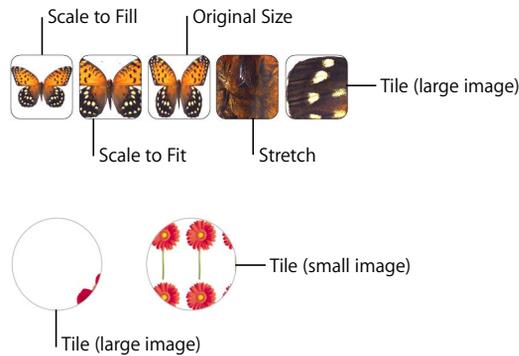
*Scale To Fit:* Resizes the image to fit the object's dimensions as well as possible. If the object's shape is different from the original image's, parts of the image may not appear; blank space may also appear around the image.

*Scale To Fill:* Makes the image appear larger or smaller, sizing it to leave minimum space around the image, even if the object and image have different shapes.

*Stretch:* Sizes the image to fit the object's dimensions but distorts it if the object has a shape different from the original image.

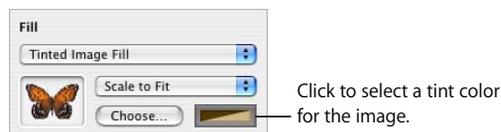
*Original Size:* Places the image inside the object without altering its original dimensions. If the image is larger than the object, you see only a part of the image in the object. If the image is smaller than the object, there is blank space around it.

*Tile:* Repeats the image inside the object, if the image is smaller than the object. If the image is larger than the object, you see only part of the image inside the object.



- 5 To place a transparent tint over the image, choose Tinted Image Fill from the Fill pop-up menu.

Click the color well next to the Choose button, and then select a tint color in the Colors window. Drag the Opacity slider in the Colors window to make the tint darker or lighter. (If you drag the Opacity slider in the Graphic Inspector, it will change the opacity of both the tint *and* the image.)



## Using Shapes

Numbers comes with predrawn shapes. You can also create your own custom shapes.

### Adding a Predrawn Shape

You can insert predrawn shapes, such as triangles, arrows, circles, and rectangles, to use as simple graphics.

**Here are ways to add a predrawn shape:**

- Click Shapes in the toolbar, and then choose a shape from the Shapes submenu.

You can also choose Insert > Shape > *shape type*.

- You can also draw a shape. Option-click Shapes in the toolbar, release the Option key, choose a shape, and then drag the crosshair pointer across the sheet to create a shape that's the size you want.

To constrain the shape (for example, to keep triangles equal on all sides), press the Shift key as you drag.

### Adding a Custom Shape

You can use the Draw tool to create your own shapes.

**To create a custom shape:**

- 1 Click Shapes in the toolbar, and then select the Draw tool icon. You can also choose Insert > Shape > Draw a Shape.



The pointer changes from an arrow to a small pen tip.



- 2 Click anywhere on a sheet to create the first point of the custom shape.
- 3 To create a second point and connect it with the first point using a straight line, click a second location.

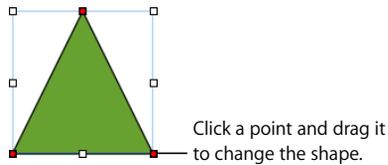
To create a curved segment instead of a straight one, click in the second location and then drag the mouse to change the curve angle or extend the curve. Release the mouse when you're satisfied with the curve.

The line that connects the two points has the default stroke style for the template you're using. You can change the line into another kind of line later using the Stroke settings in the Graphic Inspector.



## Manipulating Points of a Shape

You can change the contour of a shape by adding, moving, or deleting its points. First you need to make the shape editable, as described in “Making Shapes Editable” on page 165.



### Here are ways to manipulate a shape’s points:

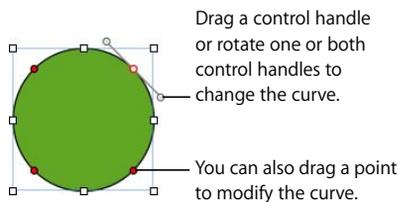
- To add a point, make the shape editable, press the Option key, and hold the pointer over the shape’s border. The pointer changes into a pen tip with a plus sign (+). Click the location on the border where you want to add a point, and move the point if needed.
- To move a point, make the shape editable, click the point, and then drag it to another location. You can move several points at the same time by Shift-clicking multiple points and then dragging.
- To delete a point, make the shape editable, click the point, and then press the Delete key. You can delete several points at the same time by Shift-clicking multiple points and then pressing Delete.

## Reshaping a Curve

You can expand or contract a curve, or change its angle.

### To reshape a curve:

- 1 Make the shape editable.
- 2 Click a red circular control on the curve you want to reshape. A control handle appears on both sides of the circular control.



- 3 To expand or contract the curve, drag the circular control or one of the control handles.
- 4 To change the angle of the curve, move the control handles clockwise or counter-clockwise. You achieve different effects when you move the handles together or independently of each other. Experiment until you achieve the desired effect.

To move the control handles together, press the Option key, and then drag one or the other of them.

To move only one control handle, press the Command key before dragging a handle.

### Reshaping a Straight Segment

You can change the angle between two segments, or change the length of a segment.

**To reshape a straight segment:**

- 1 Make the shape editable.
- 2 Click a corner point.
- 3 To change the angle between the two attached segments, drag the point clockwise or counter-clockwise.
- 4 To change the length of one of the segments, drag the point out or in.

### Transforming Corner Points into Curved Points and Vice Versa

You can change one or more points into curves or curves into points.

**Here are ways to transform corner points into curved points and vice versa:**

- To change a corner point into a curved point, make the shape editable, and then double-click the corner point.
- To change a curved point into a corner point, make the shape editable, and then double-click the curved point.
- To change all corner points in one or more shapes into curved points, make the shapes editable, select the shape(s), and then choose Format > Shape > Smooth Path.
- To change all curved points in one or more shapes into corner points, make the shapes editable, select the shape(s), and then choose Format > Shape > Sharpen Path.

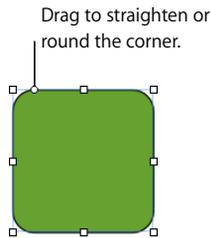
After a shape is editable, you can use the Smooth Path and Sharpen Path commands without making the shape editable again.

## Editing Specific Predrawn Shapes

Some predrawn shapes have special built-in editing controls.

### Editing a Rounded Rectangle

The rounded rectangle has a circular control that lets you change the corners.

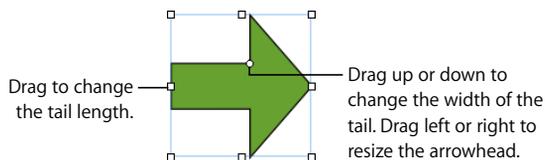


#### To edit a rounded rectangle:

- Select the shape, and drag its circular control to the left to straighten the corners and to the right to round them.

### Editing Single and Double Arrows

The arrows have three special controls.

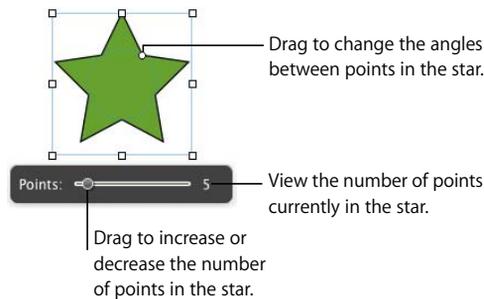


#### Here are ways to edit single and double arrows after selecting them:

- Drag the selection handle on the arrow's tail or arrowhead to increase or decrease the tail's length and width without changing the shape of the arrowhead.
- Drag the circular control up or down to change the width of the tail.
- Drag the circular control left or right to resize the arrowhead.

## Editing a Star

The star shape has a slider for increasing and decreasing the number of points in the star and a circular control for changing the angles between points.

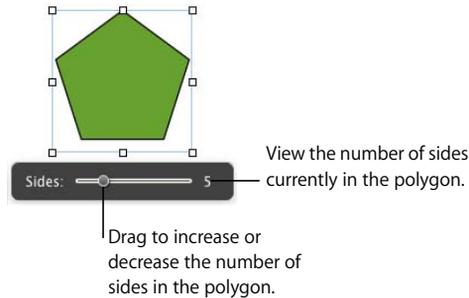


### Here are ways to edit a star:

- When you select a star shape, the slider appears. Drag the slider to increase or decrease the number of points in the star.
- Drag the circular control to change the angles between points in the star.

## Editing a Polygon

The polygon has a slider for increasing and decreasing the number of sides in the polygon.



### To edit a polygon:

- When you select the polygon, the slider appears. Drag the slider to increase or decrease the number of sides in the polygon.

## Using Media Placeholders

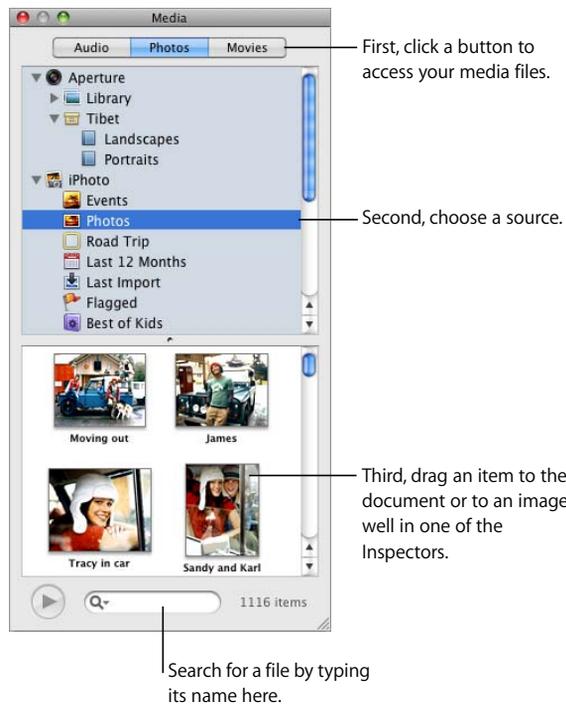
Some Numbers templates contain media placeholders. You can drag your own images, movies, and audio files to these placeholders, and your media file is automatically sized and positioned for you. You can easily replace an item in a media placeholder by dragging a new file to it; you don't have to delete the old file first.

You can recognize a media placeholder by letting the pointer rest over it; a help tag appears instructing you to drag your own image into its place.

### Here are ways to work with media placeholders:

- Drag a file from the Media Browser, Finder, or other application to the media placeholder.

To open the Media Browser, click Media in the toolbar. Click a button at the top of the window to look for photos, audio files, or movies.



- To change the content of a media placeholder, drag a new media file to the existing content.

- To convert a placeholder image into an ordinary image, select the image, choose Format > Advanced, and then deselect “Define as Media Placeholder” in the submenu. To replace an ordinary image, you must first delete it.
- To delete a media placeholder, select it and press the Delete key.
- To create a media placeholder, follow the instructions in “Creating Media Placeholders for a Custom Template” on page 191.

## Working with Images

Numbers accepts all QuickTime-supported formats, including the following graphics file types:

- TIFF
- GIF
- JPEG
- PDF
- PSD
- EPS
- PICT

After importing an image into a spreadsheet, you can mask (crop) it and change its brightness and other settings. You can place an image inside a shape, text box, chart element, or table cell. Numbers also lets you work with graphics with transparency (alpha-channel graphics).

## Importing an Image

Import an image directly from the Finder or from the Media Browser.

### Here are ways to import an image file:

- Drag an image file from the Finder to the spreadsheet and position it where you want it.
- Click Media in the toolbar, click Photos in the Media Browser window, select the album where your picture is located, and then drag a thumbnail to position it where you want it.
- Choose Insert > Choose, select the file, and then click Insert. Drag the image to position it where you want it.
- To add an image file using a media placeholder, see “Using Media Placeholders” on page 170.

## Masking (Cropping) Images

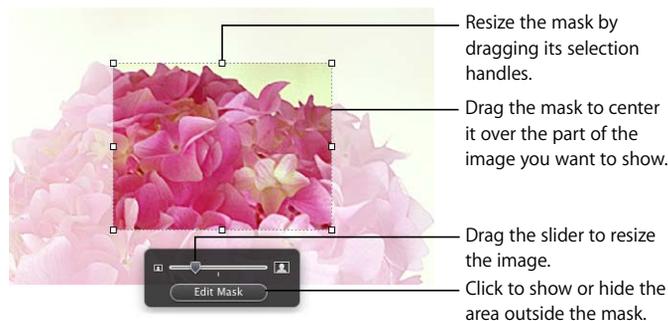
You can crop images without actually changing the image files by *masking* parts of them.

### Cropping an Image Using the Default (Rectangular) Mask

You can use a rectangular mask to define the boundaries of an image.

#### To crop an image using the default (rectangular) mask:

- 1 Import the image you want to mask (see “Importing an Image” on page 171 for instructions).
- 2 Select the image, and then choose Format > Mask. A resizable mask appears over the image, and some controls appear.



- 3 To resize the image, move the slider left or right.
- 4 Refine the mask.

Drag the selection handles to resize the mask. To constrain the mask's proportions, hold down the Shift key as you drag the selection handles.

To rotate the mask, hold down the Command key as you drag a corner selection handle.

Place the mask over the part of the image you want to show. You can click at the edge of the selected mask and drag the mask. Or you can click in the image outside the mask and drag the image.
- 5 To make only the area under the mask visible, double-click the mask, press Return, click outside the image, or click Edit Mask. The borders of the masked image are dotted lines.
- 6 To resize or rotate the masked image, drag or Command-drag its selection handles.
- 7 To deselect the image and hide the mask controls, click outside the image.

To view the whole image, double-click it. To edit the mask, click Edit Mask.

## Masking an Image with a Shape

You can use a shape to define the boundaries of an image.

### To mask an image with a shape:

- 1 Select the image and choose Format > “Mask with Shape” > *shape*.  
You can also Shift-click to select a shape and an image, and then click Mask in the toolbar (or choose Format > “Mask with Selected Shape”).
- 2 Drag the image to position the part you want to show. To move the mask, click the dotted edge of the mask and drag it.
- 3 To resize the image, drag the slider above the Edit Mask button.
- 4 To resize the mask, drag the selection handles.
- 5 To make only the area under the mask visible, double-click the mask or image, press Return, click outside the image, or click Edit Mask.
- 6 To resize the masked image, click Edit Mask and drag the selection handles.
- 7 To deselect the image and hide the mask controls, click outside the image.

To modify a masked image, double-click it.

**Note:** If you use a shape containing text as a mask, the text is deleted. To restore the text, choose Edit > “Undo Mask with Shape.”

You can also drag an image to mask a shape with an image.

## Unmasking an Image

You can remove a mask and restore the original image.

### To unmask an image:

- Select the masked image, and then choose Format > Unmask.

## Removing the Background or Unwanted Elements from an Image

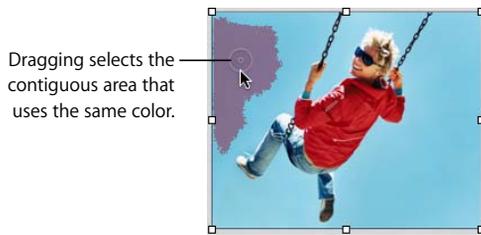
The Alpha tool enables you to convert certain colors in an image to transparent. This feature is useful for removing an unwanted background or other colors.

You’ll get the best results removing solid colors with clear boundaries around them. To remove areas that are less distinct, select a smaller area and repeat the process.

### To remove unwanted elements:

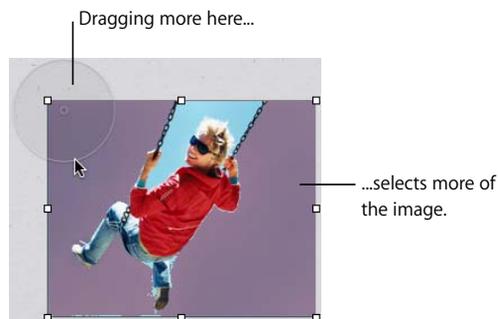
- 1 Select the image.
- 2 Choose Format > Instant Alpha.

- 3 Click the color you want to make transparent, and then drag slowly over it.



As you drag, the selection grows to include the area that uses the same color. You can control how much of the image is selected by dragging less or more.

- 4 Repeat step 3 as many times as you like.



- 5 Press Return or click outside the image when you're done.

You can restore the parts removed from the image at any time. To revert to the original image, choose Format > Remove Instant Alpha. To restore parts of the image removed using Instant Alpha, choose Edit > Undo Instant Alpha until the parts have been restored.

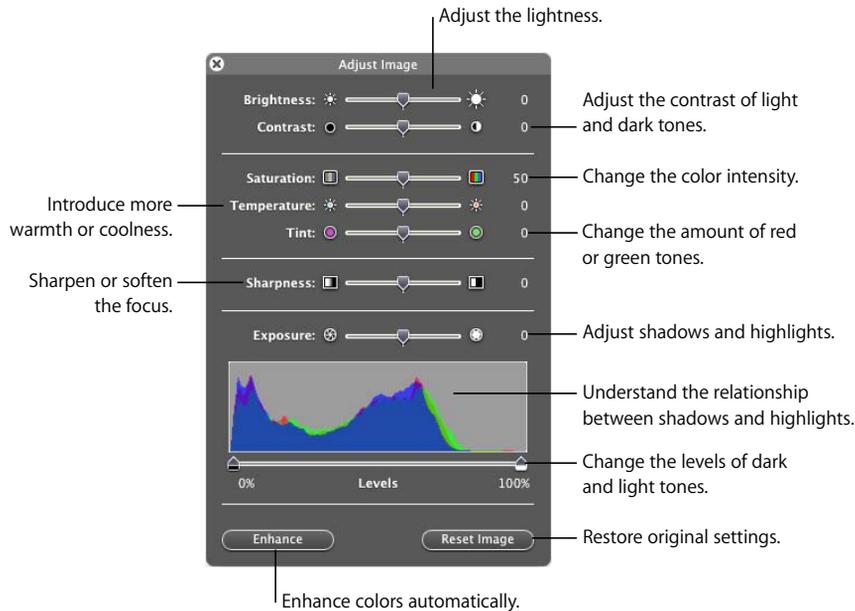
## Changing an Image's Brightness, Contrast, and Other Settings

You can change the brightness, contrast, and other settings of images to improve their quality or to create interesting effects. Adjustments you make don't affect the original image; they affect only the image's appearance in Numbers.

**To adjust an image:**

- 1 Select the image.

2 Choose View > Show Adjust Image to open the Adjust Image window.



3 Use the controls to make adjustments.

*Enhance button:* Automatically adjusts the image.

*Brightness:* Adjusts the lightness of the image.

*Contrast:* Adjusts the contrast of light and dark tones. You can make shadows darker, sharpen the edges of objects, and make colors stand out more. If you increase the contrast of a photo a lot, it looks more like an illustration.

*Saturation:* Changes the color intensity.

*Temperature:* Introduces more warmth (more orange tones) or coldness (more blue tones).

*Tint:* Changes the amount of red or green tones in the image.

*Sharpness:* Sharpens or softens the image's focus.

*Exposure:* Adjusts shadows and highlights.

*The histogram:* Helps you understand the relationship between shadows (depicted on the left side of the display) and highlights (depicted on the right side) in your image.

*Levels:* Changes the levels of light and dark tones.

*Auto Levels:* Has Numbers enhance colors automatically.

- 4 To restore the original settings, click Reset Image.

To save any changes you made, save the spreadsheet. The settings at the time you save the spreadsheet are visible anytime you open the Adjust Image window.

### Using PDF Files as Graphics

If you intend to greatly enlarge or reduce a graphic's dimensions, consider converting it to a PDF file before bringing it into Numbers. PDF files don't lose their crispness when they are significantly resized. Other file types may not retain their clarity as well when they are enlarged or reduced.

PDF files also provide a great way to move tabular data from Excel or AppleWorks documents into Numbers. If you have extensively formatted tables in Excel or an AppleWorks spreadsheet that you want to display in your spreadsheet, you can save the spreadsheet as a PDF file and then place that PDF file on a page as you would any other external graphics file.

#### To convert an Excel or AppleWorks file to a PDF file:

- 1 In your Excel or AppleWorks spreadsheet, select the table range you want to display in your spreadsheet.
- 2 Choose File > Print.
- 3 In the Print dialog, choose Save as PDF from the PDF pop-up menu.
- 4 In the Save dialog, type a name for the PDF file and select a location, and then click Save.

You can copy a range of cells in an Excel document and paste the cells and their contents directly into your spreadsheet. Numbers creates a new table to hold the Excel data.

You can also convert an image to a PDF file by using Grab. Open Grab (it's in the Applications/Utilities folder). Choose Capture > Selection to select what you want to create an image of. Choose File > Print to save the image as a PDF.

## Using Sound and Movies

You can add sound, movies, and Flash files to your spreadsheet if it will be viewed onscreen as a Numbers file. The movie or sound file plays when you double-clicks its icon.

**Note:** Some media files are protected under copyright law. Also, some downloaded music may be played only on the computer where the download occurred. Make sure you have permission to use the files you want to include.

Numbers accepts any QuickTime or iTunes file type, including the following:

- MOV
- FLASH
- MP3
- MPEG-4
- AIFF
- AAC

**Important:** To make sure that the movies and other media can be played and viewed when your document is transferred to another computer, make sure that “Copy audio and movies into document” is selected; after you choose Save or Save As, click the disclosure triangle next to the field, and then click Advanced Options.

### Adding a Sound File

Add a sound file that plays when you double-click its icon.

**Here are ways to add a sound file:**

- Drag a sound file from the Finder to a sheet.
- Click Media in the toolbar, click Audio, select an audio file, and then drag the file to the sheet.
- To add a sound file using a media placeholder, see “Using Media Placeholders” on page 170.

### Adding a Movie File

Add a movie file that plays when you double-click it.

**Here are ways to add a movie:**

- Drag a movie file from the Finder to a sheet.
- Click Media in the toolbar, click Movies, select a file, and then drag it to the sheet.

To see your movies listed in the Movies pane of the Media Browser, you must place them in the Movies folder, in iTunes, or in iPhoto.

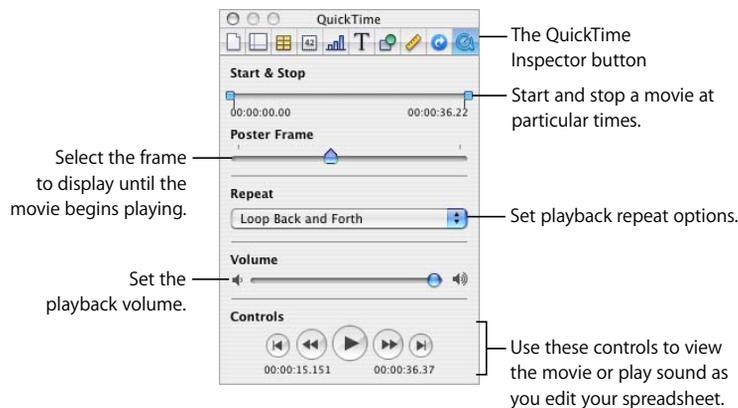
- Choose Insert > Choose, select the movie file, and then click Insert.
- To add a movie file using a media placeholder, see “Using Media Placeholders” on page 170.

## Adjusting Media Playback Settings

In the QuickTime Inspector, you can change such settings as when to start and stop a movie, and the frame to display until the movie starts playing.

### To set media playback preferences:

- 1 Click Inspector in the toolbar, and then click the QuickTime Inspector button.
- 2 Click the movie or sound object to select it.
- 3 To start and stop the movie at particular frames or times, drag the Start and Stop sliders.
- 4 To specify which frame of a movie to display until the movie starts playing (called the “poster frame”), drag the Poster Frame slider until the movie displays the image you want.
- 5 Choose a repeat option from the Repeat pop-up menu:
  - None*: Play only once.
  - Loop*: Repeat continuously.
  - Loop Back and Forth*: Play backward and forward continuously.



- 6 To increase or decrease the playback volume, drag the Volume slider to the right or left.

# Adding Address Book Data to a Table

# 9

This chapter tells you how to add contact information stored in Address Book and vCards to a Numbers table.

Address Book fields are a rich source of names, phone numbers, addresses, and other data for people. You can use Address Book data to quickly create tables that consolidate information you need for business contacts, personal friends, holiday correspondents, and so on.

## Using Address Book Fields

You can insert data from Address Book fields into Numbers tables. You can also insert data from a virtual address card (vCard) that someone has sent you.

When a table has a header row containing names that match Address Book or vCard field names, you can add contact data by dragging cards to the table. You can also create a new table by dragging cards to the canvas.

## Mapping Column Names to Address Book Field Names

The following table summarizes the Address Book fields that Numbers supports. The synonyms are alternative names you can use to add a particular Address Book field value.

Address Book field names	Field name synonyms
Prefix	Name title, Name prefix
Last name	Last, Surname
First name	First, Given name, Forename
Suffix	Name suffix, Professional suffix, Academic suffix
Nickname	
Maiden name	
Job title	
Department	Job department
Company	
Phone (first available number)	
Main phone	
Work phone	
Home phone	
Mobile	Mobile phone, Mobile telephone, Cell phone, Cell telephone, Cellular, Cellular phone, Cellular telephone
Home fax	
Work fax	
Pager	Beeper
Other phone	
Email (first available address)	Email address
Work email	
Home email	
Other email	
URL (first available URL)	
Work URL	
Home URL	
Other URL	
Birthday	
AIM (first available address)	IM, IM handle, IM name, IM address, Chat, Chat handle, Chat name, Chat address
Work AIM	Work IM, Work IM handle, Work IM name, Work IM address, Work chat handle, Work chat name, Work chat address

Address Book field names	Field name synonyms
Home AIM	Home IM, Home IM handle, Home IM name, Home IM address, Home chat, Home chat handle, Home chat name, Home chat address
Other AIM	Other IM, Other IM handle, Other IM name, Other IM address, Other chat, Other chat handle, Other chat name, Other chat address
Yahoo	
Work Yahoo	
Home Yahoo	
Other Yahoo	
Address	
Street address (first available street address)	Street
City (first available city)	Town
State (first available state)	
Zip	Zip code, Postal code
Country (first available country)	
Work address	
Work street address	Work street, Work address
Work city	Work town
Work state	
Work zip	Work zip code, Work postal code
Work country	
Home Address	
Home street address	Home street, Home address
Home city	Home town
Home state	
Home zip	Home zip code, Home postal code
Home country	
Other address	
Other street address	Other street, Other address
Other city	Other town
Other state	
Other zip	Other zip code, Other postal code
Other country	
Note	Notes

## Adding Address Book Data to an Existing Table

You can add data from Address Book or from a vCard to an existing table if the table's header row contains names that match the field names listed in "Mapping Column Names to Address Book Field Names" on page 180.

### To add contact data to an existing table:

- 1 Identify the Address Book or vCard fields whose values you want to copy into the table.
- 2 Make sure the table has a header row whose cells contain supported Address Book or vCard field names.

Data in fields that can't be mapped to a header row cell won't be added to the table.

- 3 In Address Book, select one or more contacts or groups and drag them to the table.

You can also drag one or more vCards to the table.

If necessary to accommodate all the data, rows are added.

If a contact's data already exists in the table, another row for the contact is still added. You can detect duplicate rows using sorting, as "Sorting Table Cells" on page 77 describes.

## Adding Address Book Data to a New Table

You can use data from Address Book or from a vCard to create a new table that contains a row for individual contacts.

### Here are ways to create a new table that contains contact data:

- In Address Book, select one or more cards or a group and drag the selection to the canvas.
- Drag one or more vCards to the canvas.

The table contains a column for each Address Book or vCard field named, as "Mapping Column Names to Address Book Field Names" on page 180 indicates. However, only fields named Last name, First name, Phone, and Email are initially visible; the other columns are hidden. To view the hidden columns, choose Table > Unhide All Columns. You can delete or rename columns as required.

This chapter describes the various ways you can distribute your Numbers spreadsheet so others can view or use it.

In addition to printing or faxing your spreadsheet, you can share your spreadsheet electronically. By exporting to other document formats, you can collaborate with others who use Excel and other applications. You can also send a document directly to iWeb to attach it to a blog entry.

## Printing a Sheet

You can use Print View to lay out a sheet across pages before printing the sheet.

### To print a sheet:

- 1 To format a sheet into pages, see “Dividing a Sheet into Pages” on page 39.
- 2 Select the sheet you want to print.
- 3 Choose File > Print Sheet.
- 4 To preview the sheet before printing it, click the Preview button in the Print dialog. The sheet opens in Preview, which shows what individual pages will look like when printed. For information about using Preview, see Preview Help. Choose Help > Preview Help when the Preview window is active.

Select Soft Proof at the bottom-left corner of the Preview window to take your printer’s capabilities into account. For example, if you’re printing a color document to a black-and-white printer, selecting Soft Proof previews the document in black and white.

Click Print to print your sheet directly from the Preview window. Click Cancel, click in your sheet, and then choose File > Print Sheet to set up additional printing options.

- 5 Choose the printer you want to use from the Printer pop-up menu.

Type the number of copies you want to print in the Copies field, and then select Collated if you want each group of pages to print together in order before printing the next group. If you want to print a batch of page 1, then page 2, then page 3, and so on, deselect the checkbox.

- 6 Use the Copies & Pages pop-up menu in the Print dialog to select printing options. You can print your sheet in reverse order, print only odd or even pages, print a cover page (separator page), and more.

See “Choosing Printer Layout Options” to learn how to print double-sided and “Adjusting the Printed Color with ColorSync” on page 185 to learn how to manage color settings.

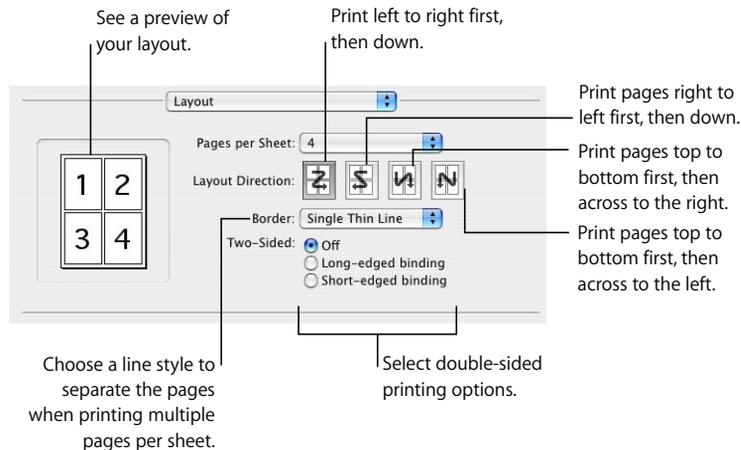
- 7 Click Print.

## Choosing Printer Layout Options

Print double-sided and set other printer options that control how a sheet is printed.

**To select layout options:**

- 1 Choose File > Print Sheet.
- 2 Choose Layout from the pop-up menu below the Presets pop-up menu in the Print dialog.
- 3 To print several pages on a single sheet of paper, choose Layout from the pop-up menu below the Presets pop-up menu.



Choose the number of pages you want to appear on each page from the “Pages per Sheet” pop-up menu. Select a layout direction, and then choose the line style you want to separate each printed page from the Border pop-up menu.

- 4 To print double-sided, choose Layout from the pop-up menu below the Presets pop-up menu, and then select a binding option.

*Long-Edge Binding:* Prints the pages for lengthwise binding.

*Short-Edge Binding:* Prints the pages for binding on the short side of the paper.

Not all printers can print double-sided. Check the documentation that came with your printer.

- 5 To save your printing options as a preset that you can use later instead of respecifying options, choose Save As from the Presets pop-up menu in the Print dialog and then type a name for the preset.

To use the same settings in the future, choose the preset's name from the Presets pop-up menu.

### Adjusting the Printed Color with ColorSync

You can make printed sheets lighter, darker, or sepia-toned, or add other effects by adding a Quartz filter to your printer output. The filter uses ColorSync technology to modify the printed sheet without modifying the sheet itself.

Not all printers can print in color. Check the documentation that came with your printer.

#### To adjust the printed color:

- 1 Choose File > Print Sheet.
- 2 Choose ColorSync from the pop-up menu below the Presets pop-up menu in the Print dialog.
- 3 Choose an option from the Color Conversion pop-up menu.

*Standard:* Uses the default settings in Numbers to control the color management of the printed sheet.

*In Printer:* Lets the printer you're using control the color management of the printed sheet.

- 4 Choose an option from the Quartz Filter pop-up menu.

To see a preview of the printed sheet with the Quartz filter you have chosen, click Preview.

After you have selected the Quartz filter you want, you can save this setting as part of your preset.

For more information about ColorSync and Quartz filters, see ColorSync Utility Help by opening the ColorSync application (located in Applications/Utilities), and then choosing Help > ColorSync Utility Help.



— The ColorSync Utility icon

## Exporting to Other Document Formats

You can share your Numbers spreadsheets across different platforms by exporting them to a file in Excel, PDF, or comma-separated values (CSV) format.

### To export a spreadsheet to another file format:

- 1 Choose File > Export.
- 2 Choose a document format.

*PDF:* PDF files can be created using an image quality of good, better, or best. They can be viewed or printed in Preview, viewed or printed in Safari, and edited with a PDF application. Choose All Sheets from the Layout pop-up menu to create a PDF that shows each sheet on a separate page. Choose Current Sheet from the Layout pop-up menu to create a paginated PDF of the selected sheet.

*Excel:* These files can be opened and edited in Microsoft Excel on a Mac OS X computer or on a Windows computer. Each table is converted to an Excel worksheet, and all other objects are placed on separate worksheets if there's more than one table. If you don't want a summary worksheet included for multi-worksheet exports, select "Never include a summary worksheet" in the export dialog. Some of the formula calculations may differ in Excel.

*CSV:* Many spreadsheet applications can open a file in CSV format. In a CSV file, cell values in each row are separated using a comma, and rows are separated using an end-of-line character. Each table is placed in its own CSV file, and all the files are placed in a folder. No graphics are exported. The last calculated values are exported.

- 3 Click Next.
- 4 Type a new name for the document.
- 5 Choose where you want to save the document.
- 6 Click Export.

## Sending a Spreadsheet to iWeb

If you use (or intend to use) iWeb to create a website, you can send a Numbers spreadsheet directly to your iWeb blog or podcast. The spreadsheet becomes an attachment that your website visitors can download.

### To send a spreadsheet to iWeb:

- 1 Make sure you have iWeb '08 or later installed.
- 2 Open your Numbers spreadsheet, and then choose File > Send to iWeb > PDF or choose File > Send to iWeb > Numbers Document.

*PDF* creates a PDF version of your spreadsheet.

*Numbers Document* creates an archive version of your spreadsheet.

- 3 If iWeb wasn't open, it opens, and you can choose a new or existing blog or podcast to attach your spreadsheet to. If you have only one blog or podcast, the spreadsheet is attached to it.

When you publish your website, visitors who subscribe to your blog or podcast will automatically get the latest attachments sent to their iTunes library (PDF publish only).

For more information about using iWeb to design and publish webpages, open iWeb and choose Help > iWeb Help.

This chapter is for designers who want to create their own spreadsheet templates.

This chapter assumes you are already familiar with the features of Numbers described in earlier chapters.

## Designing a Template

The templates that come with Numbers provide ideas for designing the look of charts, tables, and other objects.

To create your own templates, you can do something as simple as adding your company logo to an existing template. Or you can modify these attributes of a Numbers template:

- Table styles
- Reusable tables available when you click Tables in the toolbar
- Default formatting for different types of charts
- Default attributes of text boxes, shapes, and images
- The number and names of sheets
- Predefined content on sheets, such as text, tables, and media placeholders

You can also start with a blank spreadsheet and create a new template.

### Step 1: Define Table Styles

A template has one or more table styles that let you format a selected table in a single click. Table styles are useful for applying consistent formatting to tables.

You can use or redefine the table styles in a Numbers template, or you can create your own styles. See “Using Table Styles” on page 79 to learn how.

## Step 2: Define Reusable Tables

A template has one or more reusable tables, which let you add tables that have already been styled and sized. They can also contain predefined content, such as formulas and text.

When using a template, you add a reusable table by clicking Tables in the toolbar and choosing a table from the pop-up menu.

You can use or redefine the reusable tables in a Numbers template, or you can create your own. “Defining Reusable Tables” on page 49 provides instructions.

## Step 3: Define Default Charts, Text Boxes, Shapes, and Images

A template has default values defined for the following objects, which take effect when a template user adds one of them:

- Charts
- Text boxes
- Shapes
- Imported images

You can use the default settings that already exist in the template you started with, or you can change the settings.

### Defining Default Attributes for Charts

You can set the default appearance of each chart type. Default attributes must be set individually for each chart type.

**To set default chart attributes:**

- 1 Place a chart on the page by clicking Charts in the toolbar and choosing a chart type.
- 2 Select the chart, and then set its attributes.

To resize a chart, rotate it, and set other attributes that charts have in common, see “Formatting General Chart Attributes” on page 106.

To learn how to format pie charts, bar charts, and other specific chart types, see “Formatting Specific Types of Charts” on page 113.

- 3 Repeat steps 1 and 2 for each chart type for which you want to define default attributes.
- 4 Select a chart, and then choose Format > Advanced > Define Default Style for *chart type*.

Repeat this action for each chart you’re defining default settings for.

- 5 Delete the charts from the spreadsheet.

## Defining Default Attributes for Text Boxes and Shapes

The default attributes of text boxes and shapes determine their fill, stroke, shadow, and opacity when they're first inserted on a page. Default attributes also determine the appearance of text you place in the boxes or shapes.

### To define default text boxes and shapes:

- 1 Add the objects to a sheet.  
Click Text Box in the toolbar to add a text box, and click Shapes in the toolbar and choose any shape.
- 2 To set up attributes for text within the text box or shape, select the object, add text to it, then format the text attributes.  
See "Formatting Text Size and Appearance" on page 120 for instructions.
- 3 To set up object attributes, select the text box or shape and then follow the instructions in "Modifying Objects" on page 154 and "Filling an Object with Color" on page 160.
- 4 Save the text box and shape as default objects.  
To save the text box, select it and then choose Format > Advanced > Define Default Text Box Style.  
To save the shape, select it and then choose Format > Advanced > Define Default Shape Style.
- 5 Delete the text box and shape from the sheet.

## Defining Default Attributes for Imported Images

For imported graphics, you can set default shadows, opacity, borders, and more.

### To set default image attributes:

- 1 Import an image as "Importing an Image" on page 171 describes.
- 2 Select the image, and then set its attributes.  
To format borders around the image, see "Changing the Style of Borders" on page 155 and "Framing Objects" on page 156.  
To add a shadow, see "Adding Shadows" on page 156 for instructions.  
To add a reflection, see "Adding a Reflection" on page 158.  
To adjust the image's transparency, see "Adjusting Opacity" on page 158.
- 3 Choose Format > Advanced > Define Default Image Style.
- 4 Delete the image from the page.

## Step 4: Create Initial Spreadsheet Content

You can use predefined content to model the look of a finished spreadsheet or to provide instructions and other productivity aids for template users.

### Predefining Tables and Other Objects for a Custom Template

Add tables, charts, text boxes, images, shapes, and other initial content to your templates to help users be more productive and to make the objects in the spreadsheet visually appealing.

For example, you can:

- Add names to tables and titles to charts and their axes
- Add formulas and other predefined content to table cells
- Set up cells so their values are displayed in particular ways, for example, using a number format or checkboxes
- Create text boxes or comments that provide instructions and suggestions for using the template
- Use color to heighten the prominence of particular elements in tables and charts

### Creating Media Placeholders for a Custom Template

When you drag your own image, movie, or audio file to a media placeholder, your media is automatically sized and positioned for you. You can easily replace media in the media placeholder by dragging a new file to it; you don't have to delete the old file first.

**To create a media placeholder:**

- 1 Add an image, audio file, or movie to the spreadsheet.  
See "Importing an Image" on page 171, "Adding a Sound File" on page 177, and "Adding a Movie File" on page 177 for instructions.
- 2 Select the imported object and move it to the location where you want it to be in the spreadsheet, as "Moving Objects" on page 150 describes.
- 3 Format the imported object, as "Modifying Objects" on page 154 describes.
- 4 Select the object, and then choose Format > Advanced > Define as Media Placeholder.

To delete a media placeholder, select it, and then press the Delete key.

## Predefining Sheets for a Custom Template

Add multiple sheets to a template when it contains content you want to separate into groups.

**Here are ways to set up sheets for a template:**

- You can add sheets to or remove sheets from a Numbers template. See “Adding and Deleting Sheets” on page 38 for details.
- To move sheets around and reorder their content, see “Reorganizing Sheets and Their Contents” on page 38.

## Step 5: Save a Custom Template

You can save your new template so that it appears in the Template Chooser.

**To save a custom template:**

- 1 Choose File > Save as Template.
- 2 Type a name for the template.
- 3 Specify a folder in which to save your template.

By default, it will be saved in your home folder in Library/Application Support/iWork/Numbers/Templates/My Templates/ and it will appear in the My Templates pane of the Template Chooser.

To save it in another location in your home folder, go to Library/Application Support/iWork/Numbers/Templates/ and create a new folder. The folder name is used as the template category in the Template Chooser.

- 4 Click Save.

To delete a custom template, in the Finder navigate to the folder in which you saved the template, and drag the template to the Trash.

This chapter describes functions you can use in cell formulas.

This chapter describes each of the functions you can use in a table cell formula. For information about using functions in table cell formulas, see “Using Formulas” on page 83 and “Using Functions” on page 96.

## About Functions

A function is a named operation that you can include in a formula to perform a calculation or to manipulate data in a table cell.

Numbers provides 168 functions that do things such as perform common mathematical or financial operations, retrieve cell values based on a search, manipulate strings of text, or get the current date and time. Each function has a name followed by one or more arguments enclosed in parentheses. You use arguments to provide the values that the function needs to perform its work.

For example, the following formula contains a function named SUM with a single argument (a range of cells) that adds the values in column A, rows 2 through 10:

```
=SUM(A2:A10)
```

The number and types of arguments vary for different functions. Possible arguments include:

- Constants, such as a number, a text string, or Boolean TRUE or FALSE—for example, CONCATENATE(“cat,”s”)
- A calculation, including a Boolean value—for example, OR(4<1, 5<6)
- The address of a table cell or a range of cells—for example, LOOKUP(5, C2:C6, D2:D6)
- Another function—for example, WEEKDAY(TODAY()).

**Note:** Character strings are ignored in functions that use values to perform calculations.

The following table defines terms that are commonly used in function descriptions.

Term or symbol	Meaning
<i>italic</i>	An argument you replace with an actual value or a reference to a cell containing a value.
commas and semicolons	The syntax descriptions for functions use commas to separate arguments. If your International System Preferences are set up to use the comma as a decimal separator, separate arguments using a semicolon instead of a comma.
[ brackets ]	Surround an optional argument. If you omit an optional argument in the middle of a list of arguments, be sure to include the separator that precedes the missing argument. For example, to omit the second argument, arg2, from a list of three arguments, you would type FUNCTION(arg1, , arg3).
... (ellipses)	The preceding argument can be repeated as many times as necessary.
integer	A number with no fractional part.
logical expression	An expression that has the Boolean value TRUE or FALSE.
numeric expression	An expression that produces a number.
string	A contiguous sequence of characters.
text expression	An expression that produces a string.
<i>date-time</i>	Any Numbers date/time value. While you can choose to display only date or time in a cell, all Numbers date or time values contain both the date and time.

There are several categories of functions. For example, some functions perform calculations on date and time values, logical functions give a Boolean (TRUE or FALSE) result, and other functions perform financial calculations. Following a brief introduction to the function categories, this chapter defines each function individually, in alphabetical order by function name.

## Date and Time Functions

The date and time functions perform calculations on date, time, or numeric expressions.

Numbers includes these date and time functions.

Function	Description
DATE (page 224)	Combines individual year, month, and day numbers into a single date.
DATEDIF (page 225)	Finds the time interval between two dates.
DAY (page 226)	Extracts the day number from a date.
EDATE (page 229)	Finds the date some number of months before or after a given date.
HOUR (page 235)	Extracts the hour (in the range 0 through 23) from a date.
MINUTE (page 250)	Extracts the minutes from a date.
MONTH (page 251)	Extracts the month number from a date.
NOW (page 253)	Gets the current date and time from the computer's clock.
SECOND (page 271)	Extracts the seconds from a date.
TIME (page 281)	Converts hours, minutes, and seconds into a time format.
TIMEVALUE (page 282)	Converts a date, a time, or a text string to a decimal fraction of a 24-hour day.
TODAY (page 282)	Gets the current system date and formats the cell to display the date but not the time.
WEEKDAY (page 289)	Converts a date to a number representing the day of the week.
YEAR (page 289)	Extracts the year number from a date.

## Financial Functions

These functions operate on numbers and require numeric expressions as arguments. Unless otherwise stated, these functions return numeric values.

Numbers provides these financial functions.

Function	Description
ACCRINT (page 205)	Calculates the total accrued interest for a security that pays periodic interest.
ACCRINTM ()page 206	Calculates the total accrued interest for a security that pays interest at maturity.
COUPDAYBS (page 221)	Counts the number of days from the beginning of the coupon period in which settlement of a security occurs to the settlement date.
COUPDAYS (page 221)	Counts the number of days in the coupon period in which settlement of a security occurs.
COUPDAYSNC (page 222)	Counts the number of days from the settlement date of a security to the end of the coupon period in which settlement occurs.
COUPNUM (page 223)	Counts the number of coupons to be paid on a security between the settlement date and the maturity date.
DB (page 226)	Calculates the depreciation of an asset for a specified period using the fixed-declining balance method.
DDB (page 227)	Calculates the depreciation of an asset based on a specified depreciation rate. If you don't specify a rate, it defaults to the double-declining balance method.
DISC (page 228)	Calculates the discount rate of a security.
FV (page 233)	Calculates the future value of an investment, given a series of fixed, periodic added payments, the interest rate, and the number of periods.
IPMT (page 239)	Calculates the interest portion of a payment for a loan or investment based on periodic fixed payments and a fixed interest rate.
IRR (page 240)	Calculates the internal rate of return for an investment that is based on a series of cash flows.
ISPMT (page 242)	Calculates the interest due for a particular payment period of an investment.
MIRR ()page 250	Calculates the modified internal rate of return of a series of periodic cash flows.
NPER (page 253)	Calculates the number of payment periods for a loan or investment based on fixed payments and a fixed interest rate.

Function	Description
NPV (page 254)	Calculates the net present value of an investment based on a series of future cash flows and a fixed interest rate.
PMT (page 257)	Calculates fixed, periodic payments given a fixed interest rate, a number of periods, the present value, the future value, and the type of payments.
PPMT (page 258)	Calculates the principal portion of a payment for a loan or investment based on periodic fixed payments and a fixed interest rate.
PRICE (page 259)	Calculates the price for a security that pays periodic interest per \$100 par value.
PRICEDISC (page 260)	Calculates the price of a discounted security per \$100 par value.
PRICEMAT (page 260)	Calculates the price of a security that pays interest at maturity per \$100 par value.
PV (page 262)	Calculates the present value of an investment, given a series of fixed, periodic payments and a fixed interest rate.
RATE (page 265)	Calculates the interest rate of an annuity (a fixed sum paid periodically over a specified period of time).
SLN (page 272)	Calculates the straight-line depreciation of an asset during a period.
SYD (page 279)	Calculates the sum-of-years'-digits depreciation of an asset during a particular period.
VDB (page 287)	Calculates the depreciation of an asset over a chosen time interval.

## Logical Functions

The logical functions evaluate the logical truth or falsehood of expressions and return TRUE, FALSE, or a value assigned by the function.

Numbers provides these logical functions.

Function	Description
AND (page 208)	Returns TRUE if all arguments are true and FALSE otherwise.
FALSE (page 231)	Returns the value FALSE for compatibility with older spreadsheet applications.
IF (page 236)	Returns one of two values depending on whether a specified expression is TRUE or FALSE.
NOT (page 252)	Returns the negation of an expression's Boolean value.
OR (page 255)	Returns TRUE if any argument is true.
TRUE (page 283)	Returns the value TRUE for compatibility with older spreadsheet applications.

## Information Functions

Information functions return information about the contents of a cell or argument.

Numbers provides these information functions.

Function	Description
ISBLANK (page 240)	Returns TRUE if the specified cell is empty and FALSE otherwise.
ISERROR (page 241)	Returns TRUE if the expression in the function's argument evaluates to an error and FALSE otherwise.
ISEVEN (page 241)	Returns TRUE if the value is even and FALSE otherwise.
ISODD (page 241)	Returns TRUE if the value is odd and FALSE otherwise.

## Reference Functions

Reference functions help you find data in tables and retrieve data from cells.

Numbers provides these reference functions.

Function	Description
ADDRESS (page 207)	Constructs a cell address string from separate row, column, and table identifiers.
AREAS (page 208)	Counts how many cell ranges are in the argument.
CHOOSE (page 213)	Uses an index value to retrieve a particular value from a set of values.
COLUMN (page 214)	Returns the column number of a cell or, if no cell is specified, the column number of the cell that contains the COLUMN function.
COLUMNS (page 215)	Counts how many columns are in a range of cells.
HLOOKUP (page 234)	Retrieves a value from a range of rows by using the top row values to pick a column and a row number to pick a row in that column.
HYPERLINK (page 236)	Creates a clickable link that opens a webpage or new email message window.
INDEX (page 237)	Retrieves the value found in, or a reference to, the cell at the intersection of a specified row and column within a range of cells.
INDIRECT (page 237)	Retrieves the value at, or a reference to, a specified address.
LOOKUP (page 245)	Retrieves a value from one range of cells based on a search match in a second range.
MATCH (page 246)	Finds the position of a search value within a range.
OFFSET (page 255)	Retrieves one or more values a given number of rows and columns from a specified base cell.
ROW (page 270)	Returns the row number of a cell or, if no cell is specified, the row that contains the ROW function.
ROWS (page 270)	Counts how many rows are in a range of cells.
VLOOKUP (page 288)	Retrieves a value from a range of columns by using the left column of values to pick a row and a column number to pick a column in that row.

## Numeric Functions

The numeric functions calculate commonly used mathematical values.

Numbers provides these numeric functions.

Function	Description
ABS (page 205)	Calculates the absolute value of a number.
CEILING (page 212)	Rounds a number away from zero to the nearest multiple of a specified factor.
COMBIN (page 215)	Finds the number of different ways you can combine a number of items into groups of a specific size.
EVEN (page 229)	Rounds a number away from zero to the next even number.
EXP (page 230)	Calculates e to the power of a number.
FACT (page 230)	Calculates the factorial of a number.
FLOOR (page 232)	Rounds a number toward zero to the nearest multiple of a specified factor.
GCD (page 234)	Calculates the greatest common divisor of a set of numbers.
INT (page 238)	Returns the nearest integer less than or equal to a number.
LCM (page 243)	Finds the least common multiple of a set of numbers.
LN (page 244)	Calculates the natural logarithm of a number.
LOG (page 245)	Calculates the logarithm of a number with a specified base.
LOG10 (page 245)	Calculates the base-10 logarithm of a number.
MOD (page 250)	Calculates the remainder of a division.
MROUND (page 252)	Rounds a number to the nearest multiple of a specified factor.
ODD (page 254)	Rounds a number away from zero to the nearest odd number.
PI (page 256)	Returns an approximation of pi accurate to 15 decimal places.
POWER (page 258)	Raises a number to a power, like the ^ operator.
PRODUCT (page 262)	Calculates the product of a set of numbers.
QUOTIENT (page 263)	Calculates the integer quotient (without remainder) of two numbers.
RAND (page 264)	Generates a random number greater than or equal to 0 and less than 1.
RANDBETWEEN (page 264)	Generates a random integer in an inclusive range.
ROMAN (page 267)	Converts a number to Roman numerals.
ROUND (page 268)	Rounds a number to a specified number of digits.
ROUNDDOWN (page 268)	Rounds a number toward zero to the specified number of places.
ROUNDUP (page 269)	Rounds a number away from zero to the specified number of places.

Function	Description
SIGN (page 271)	Returns 1 when the argument is positive, -1 when the argument is negative, and 0 when it's zero.
SQRT (page 274)	Calculates the square root of a number.
SUM (page 277)	Calculates the sum of a set of numbers.
SUMIF (page 278)	Calculates the sum of a set of numbers that satisfy a specified condition.
SUMPRODUCT (page 278)	Calculates the sum of the products of corresponding numbers in two or more ranges.
SUMSQ (page 279)	Calculates the sum of the squares of a set of numbers.
TRUNC (page 283)	Truncates a decimal number to a specified number of digits.

## Trigonometric Functions

The trigonometric functions take radians as arguments.

Numbers provides these trigonometric functions.

Function	Description
ACOS (page 206)	Calculates the inverse cosine (arccosine) in the range 0 to pi radians.
ACOSH (page 207)	Calculates the inverse hyperbolic cosine of a number.
ASIN (page 209)	Calculates the inverse sine (arcsine) in the range $-\pi/2$ through $\pi/2$ radians.
ASINH (page 209)	Calculates the hyperbolic arcsine (inverse hyperbolic sine).
ATAN (page 209)	Calculates the inverse tangent (arctangent) in the range $-\pi/2$ through $\pi/2$ radians.
ATAN2 (page 210)	Finds the angle, relative to the positive x-axis, of a line passing through the origin and a specified point.
ATANH (page 210)	Calculates the inverse hyperbolic tangent of a number.
COS (page 217)	Calculates the cosine of an angle expressed in radians.
COSH (page 218)	Calculates the hyperbolic cosine of a number.
DEGREES (page 227)	Converts radians to degrees.
RADIANS (page 263)	Converts degrees to radians.
SIN (page 271)	Calculates the sine of an angle expressed in radians.
SINH (page 272)	Calculates the hyperbolic sine of a number.
TAN (page 280)	Calculates the tangent of an angle expressed in radians.
TANH (page 281)	Calculates the hyperbolic tangent of a number.

## Statistical Functions

Statistical functions perform statistical calculations and require numeric expressions as arguments. The numeric expression can be a number, cell reference, or range. Unless otherwise stated, statistical functions result in a number.

Numbers provides these statistical functions.

Function	Description
AVEDEV (page 210)	Calculates the average difference (deviation) of data points from their arithmetic mean (average).
AVERAGE (page 211)	Calculates the average (arithmetic mean) of a set of numbers.
AVERAGEA (page 211)	Calculates the average (arithmetic mean) of a set of values including numbers, text, and Boolean values.
CONFIDENCE (page 216)	Returns a value for creating a statistical confidence interval for a sample of a specified size from a population with a known standard deviation; assumes values in sample are normally distributed.
CORREL (page 217)	Calculates the correlation between two data sets based on linear regression analysis.
COUNT (page 218)	Counts the number of arguments and referenced cells that contain numbers, numeric expressions, or dates.
COUNTA (page 219)	Counts the number of arguments and referenced cells that are not empty.
COUNTBLANK (page 220)	Counts the number of cells in a range that are empty.
COUNTIF (page 220)	Counts the number of cells in a range that satisfy a condition.
COVAR (page 224)	Calculates the covariance of two data sets.
FORECAST (page 233)	Calculates the y (dependent) value that corresponds to a chosen x (independent) value by using linear regression analysis of known value pairs.
INTERCEPT (page 238)	Calculates the y-intercept of the best-fit line for a data set using linear regression analysis.
LARGE (page 242)	Retrieves the nth-largest value in a range.
MAX (page 247)	Finds the largest number in a set.
MAXA (page 248)	Finds the largest value in a set that includes numbers, text, and Boolean values.
MEDIAN (page 248)	Finds the median value in a set of numbers.
MIN (page 249)	Finds the smallest number in a set.
MINA (page 249)	Finds the smallest value in a set that includes numbers, text, and Boolean values.
MODE (page 251)	Finds the most frequently occurring value in a set of numbers.

Function	Description
PERCENTILE (page 256)	Finds the value within a range of values that corresponds to a particular percentile.
POISSON (page 257)	Calculates event rate probabilities based on the Poisson distribution.
PROB (page 261)	Calculates the probability of a range of values if you know the individual probability of each value.
RANK (page 264)	Finds the rank of a number within a range of numbers.
SLOPE (page 273)	Finds the slope of the best-fit line for a data set based on linear regression analysis.
SMALL (page 273)	Retrieves the nth-smallest value in a range.
STDEV (page 274)	Calculates the standard deviation of a set of numbers based on the sample (unbiased) variance.
STDEVA (page 275)	Calculates the standard deviation of a set of values, including text and Boolean values, based on the sample (unbiased) variance.
STDEVPA (page 275)	Calculates the standard deviation of a set of numbers based on the population (true) variance.
STDEVPA (page 276)	Calculates the standard deviation of a set of values, including text and Boolean values, based on the population (true) variance.
VAR (page 284)	Calculates the sample (unbiased) variance of a set of numbers.
VARA (page 285)	Calculates the sample (unbiased) variance of a set of values, including text and Boolean values.
VARP (page 286)	Calculates the population (true) variance of a set of numbers.
VARPA (page 286)	Calculates the population (true) variance of a set of values, including text and Boolean values.

## Text Functions

The text functions help you work with strings of characters.

Numbers provides these text functions.

Function	Description
CHAR (page 212)	Returns the character that corresponds to a numeric Unicode character code.
CLEAN (page 213)	Removes most common nonprinting characters (Unicode character codes 0–31) from text.
CODE (page 214)	Returns the Unicode code number of the first character in a string.
CONCATENATE (page 216)	Concatenates strings.
DOLLAR (page 228)	Converts a number to a string written as a dollar amount with a specified number of decimal places.
EXACT (page 230)	Returns TRUE if the argument strings are identical, including case.
FIND (page 231)	Finds the starting position of one string within another, matching both character and case but not allowing wildcards.
FIXED (page 232)	Rounds a number to a specified number of places and converts the result to a string.
LEFT (page 244)	Retrieves the specified number of characters from the left end of a string.
LEN (page 244)	Finds the number of characters in a string.
LOWER (page 246)	Converts all uppercase characters in text to lowercase.
MID (page 248)	Extracts characters from a string starting at a specified position.
PROPER (page 262)	Changes the first character in each word of a string to uppercase and all other characters to lowercase.
REPLACE (page 266)	Replaces part of a string with characters from a second string.
REPT (page 266)	Repeats text a specified number of times.
RIGHT (page 267)	Retrieves the specified number of characters from the right end of a string.
SEARCH (page 270)	Finds the starting position of one string within another, ignoring case but allowing wildcards.
SUBSTITUTE (page 277)	Replaces part of a string with new text.
T (page 280)	Retrieves text from a cell.
TRIM (page 283)	Removes spaces from text, leaving only single spaces between words.
UPPER (page 284)	Converts text to uppercase.
VALUE (page 284)	Converts a number formatted as text to a regular number.

## Function Descriptions

The function descriptions in this section are arranged in alphabetical order by function name.

### ABS

The ABS function calculates the absolute value of a number. The result is either a positive number or zero.

**ABS**(*number*)

- *number*: A number, a numeric expression, or a reference to a cell containing a numeric expression.

---

#### Examples

If cell A1 contains 5, ABS(A1) returns 5.

ABS(8-5) returns 3.

---

ABS(5-8) returns 3.

---

ABS(0) returns 0.

---

If cell A1 is empty, ABS(A1) returns 0.

---

### ACCRINT

The ACCRINT function calculates the total accrued interest for a security that pays periodic interest.

**ACCRINT**(*issue, first, settle, rate, par, frequency, [day-count]*)

- *issue*: The date when the security was issued.
- *first*: The date of the first interest payment.
- *settle*: The settlement date, usually the date when the security was purchased.
- *rate*: The coupon rate of the security, expressed as a percentage from 0 to 1.
- *par*: The face value of the security.
- *frequency*: The number of coupon payments each year.
  - 1 means annual payments.
  - 2 means semiannual payments (twice per year).
  - 4 means quarterly payments (four times per year).
- *day-count*: Optional; specifies the number of days per month and days per year used in the calculations (sometimes called the day count basis).
  - 0 or omitted uses 30/360 (30 days for each month, 360 days in a year).
  - 1 uses actual/actual (the number of days shown on a calendar).
  - 2 uses actual/360 (calendar days for each month but 360 days per year).

3 uses actual/365 (calendar days for each month but 365 days per year).

4 uses 30E/360 (European 30/360).

---

### Examples

If A1:A7 contain 1/1/2000, 3/1/2000, 7/1/2000, 0.10, 1000, 2, 0:

ACCRINT(A1, A2, A3, A4, A5, A6, A7) returns 50.

---

## ACCRINTM

The ACCRINTM function calculates the total accrued interest for a security that pays interest at maturity.

**ACCRINTM**(*issue, settle, rate, par, [day-count]*)

- *issue*: The date when the security was issued.
- *settle*: The date of the settlement, usually the date when the security was purchased.
- *rate*: The coupon rate of the security, expressed as a percentage from 0 to 1.
- *par*: The face value of the security.
- *day-count*: Optional; specifies the number of days per month and days per year used in the calculations (sometimes called the day count basis).

0 or omitted uses 30/360 (30 days for each month, 360 days in a year).

1 uses actual/actual (the number of days shown on a calendar).

2 uses actual/360 (calendar days for each month but 360 days per year).

3 uses actual/365 (calendar days for each month but 365 days per year).

4 uses 30E/360 (European 30/360).

---

### Examples

If A1:A5 contain 1/1/2000, 10/1/2000, 0.10, 1000, 0:

ACCRINTM(A1, A2, A3, A4, A5) returns 75.

---

## ACOS

The ACOS function calculates the inverse cosine (arccosine) of a number. While the COS function takes an angle and returns its cosine, the ACOS function does the opposite; it takes a cosine value and returns a corresponding angle. The resulting angle is expressed in radians, in the range 0 to pi.

**ACOS**(*cos*)

- *cos*: A cosine value in the range -1 through 1.

## Notes

To see the resulting angle in degrees instead of radians, use the DEGREES function.

---

### Examples

ACOS(SQRT(2)/2) returns 0.785398163397448, which is approximately pi/4.

---

ACOS(0.54030230586814) returns 1.

---

DEGREES(ACOS(.5)) returns 60, the degree measure of an angle that has a cosine of 0.5.

---

## ACOSH

The ACOSH function calculates the inverse hyperbolic cosine of a number.

### ACOSH(*number*)

- *number*: A number greater than or equal to 1.

---

### Examples

ACOSH(10.0676619957778) returns 3.

---

ACOSH(COSH(5)) returns 5.

---

## ADDRESS

The ADDRESS function constructs a cell address string from separate row, column, and table identifiers.

### ADDRESS(*row*, *column*, [*type*], [*style*], [*table*])

- *row*: The row number of the address.
- *column*: The column number of the address.
- *type*: Optional; a number specifying whether the row and column numbers are relative or absolute:
  - 1 or missing treats row and column as absolute references.
  - 2 treats the row number as an absolute reference and the column number as a relative reference.
  - 3 treats the row number as a relative reference and the column number as an absolute reference.
  - 4 treats both row and column numbers as relative references.
- *style*: Optional; the address style:
  - TRUE, 1, or omitted formats the address using the A1 style, in which the letter specifies the column and the number specifies the row.
  - FALSE formats the address using the R1C1 style, which isn't supported and returns an error.

- *table*: Optional; the name of the table. If the table is on another sheet, you must also include the name of the sheet.

---

### Examples

ADDRESS(3,5) creates the address \$E\$3.

---

ADDRESS(3,5,2) creates the address E\$3.

---

ADDRESS(3,5,3) creates the address \$E3.

---

ADDRESS(3,5,4) creates the address E3.

---

ADDRESS(3,3,,"Sheet 2 ::Table 1") creates the address Sheet 2 :: Table 1 :: \$C\$3.

---

## AND

The AND function returns TRUE if all arguments are true and FALSE otherwise (logical conjunction).

AND(*expression*, [*expression*, . . .])

- *expression*: A logical or numeric expression, or a reference to a cell containing such an expression.

### Notes

If *expression* is numeric, a value of 0 is interpreted as FALSE and any nonzero value is interpreted as TRUE.

---

### Examples

AND(TRUE, TRUE) returns TRUE because both arguments are true.

---

AND(1, 0, 1, 1) returns FALSE because one of the arguments is a numeric 0, which is interpreted as FALSE.

---

AND(A5>50,A5<100) returns TRUE if cell A5 contains a number between 50 and 100.

---

## AREAS

The AREAS function counts the number of ranges the function references.

AREAS(*ranges*)

- *ranges*: One or more ranges of cells. To specify more than one range, enclose the references in a second set of parentheses.

---

### Examples

AREAS(A1:F8) returns 1.

---

AREAS(C2:C8 B6:E6) returns 1.

---

AREAS((A1:F8, A10:F18)) returns 2.

---

AREAS((A1:C1, A3:C3, A5:C5)) returns 3.

---

## ASIN

The ASIN function returns the arcsine (the inverse sine) of a number. While the SIN function takes an angle and returns the sine, the ASIN function takes a sine and returns the corresponding angle. The result is expressed in radians, in the range  $-\pi/2$  to  $\pi/2$  (–90 to 90 degrees).

### ASIN(*sin*)

- *sin*: A sine value in the range –1 through 1.

### Notes

To see the resulting angle in degrees instead of radians, use the DEGREES function.

---

### Examples

ASIN(0.8411470984807897) returns 1, the radian measure (approximately 57.3 degrees) of the angle that has a sine of 0.8411470984807897.

---

DEGREES(ASIN(0.5)) returns 30, the degree measure of the angle that has a sine of 0.5.

---

## ASINH

The ASINH function calculates the inverse hyperbolic sine of a number.

### ASINH(*number*)

- *number*: Any number.

---

### Examples

ASINH(27.2899171971277) returns 4.

---

ASINH(SINH(1)) returns 1.

---

## ATAN

The ATAN function calculates the inverse tangent (arctangent) of a number and returns the corresponding angle in radians, in the range  $-\pi/2$  through  $\pi/2$  (–90 through 90 degrees).

### ATAN(*number*)

- *number*: A tangent value for which you want to find the corresponding angle.

## Notes

To see the resulting angle in degrees instead of radians, use the DEGREES function.

---

### Examples

ATAN(1) returns the angle measure 0.785398163 radians (45 degrees), which has a tangent of 1.

DEGREES(ATAN(1)) returns 45.

---

## ATAN2

The ATAN2 function calculates the angle, relative to the positive x-axis, of the line passing through the origin and the specified point. The angle is expressed in radians, in the range  $-\pi$  through  $\pi$ .

**ATAN**(*x*, *y*)

- *x*: The x-coordinate of the point the line passes through.
- *y*: The y-coordinate of the point the line passes through.

## Notes

To see the resulting angle in degrees instead of radians, use the DEGREES function.

---

### Examples

ATAN2(1, 1) returns 0.78539816 radians (45 degrees), the angle of a line segment from the origin to point (1,1).

DEGREES(ATAN2(5,5)) returns 45.

---

## ATANH

The ATANH function calculates the inverse hyperbolic tangent of a number.

**ATANH**(*number*)

- *number*: Any number between  $-1$  and  $1$ .

---

### Examples

ATANH(0.995054753686731) returns 3.

ATANH(TANH(2)) returns 2.

---

## AVEDEV

The AVEDEV function calculates the average difference (deviation) of the data points from their arithmetic mean (average).

**AVEDEV**(*datapoint*, [*datapoint*, ...])

- *datapoint*: One or more numbers, numeric expressions, or references to cells containing numbers or numeric expressions.

---

### Examples

AVEDEV(2,2,2,4,4,4) returns 1.

AVEDEV(2,2,2,2,3,3,3,3,4,4,4,4) returns 0.6666667.

---

## AVERAGE

The AVERAGE function calculates the average (arithmetic mean) of a set of numbers.

**AVERAGE**(*number*, [*number*, . . .])

- *number*: One or more numbers, numeric expressions, or references to cells containing numbers or numeric expressions.

### Notes

To calculate the average, AVERAGE divides the sum of the numbers by the number of numbers.

Table cells containing text values or Boolean values (TRUE or FALSE) are ignored. Text values included as arguments result in an error. Referenced text is ignored with no warning.

---

### Examples

AVERAGE(4,4,4,6,6,6) returns 5.

AVERAGE(2,2,2,2,3,3,3,3,4,4,4,4) returns 3.

---

## AVERAGEA

The AVERAGEA function calculates the average (arithmetic mean) of a set of values, including text and Boolean values.

**AVERAGEA**(*value*, [*value*, . . .])

- *value*: One or more numeric or Boolean values or references to cells containing numeric, textual, or Boolean values.

### Notes

Unlike the AVERAGE function, which ignores cells that don't contain numbers, AVERAGEA assigns a value of 0 to any text value, 0 to the Boolean value FALSE, and 1 to the Boolean value TRUE and includes those values in the computation.

For a data set containing only numbers, AVERAGEA returns the same result as AVERAGE.

---

### Examples

AVERAGEA(A1:A4) returns 2.5 if cells A1 through A4 contain 4, a, 6, b. The text values are counted as zeros in the sum of 10 and included in the count of values (4). Compare with AVERAGE(A1:A4), which ignores the text values completely for a sum of 10, a count of 2, and an average of 5.

---

AVERAGEA(A1:A4) returns 4 if cells A1 through A4 contain 5, a, TRUE, 10. The text value counts zero and TRUE counts 1 for a sum of 16 and a count of 4.

---

AVERAGEA(A1:A4) returns 0.25 if cells A1 through A4 contain FALSE, FALSE, FALSE, TRUE. Each FALSE counts zero and TRUE counts 1 for a sum of 1 and a count of 4.

---

## CEILING

The CEILING function rounds a number away from zero to the nearest multiple of the specified factor.

**CEILING**(*number*, *factor*)

- *number*: A number, numeric expression, or references to a cell containing a numeric expression.
- *factor*: The number whose multiples you want to round to. *factor* must have the same sign as number.

### Notes

To round down (toward zero) instead of up, use the FLOOR function.

Other functions related to rounding numbers: INT, ROUND, ROUNDUP, ROUNDDOWN, TRUNC.

---

### Examples

CEILING(0.25,1) returns 1.

---

CEILING(1.25,1) returns 2.

---

CEILING(-1.25,-1) returns -2.

---

CEILING(5,2) returns 6.

---

CEILING(73,10) returns 80.

---

CEILING(7,2.5) returns 7.5.

---

## CHAR

The CHAR function returns the character that corresponds to a numeric Unicode character code.

**CHAR**(*code-number*)

- *code-number*: A number from 1 through 65535 for which you want to generate the corresponding character.

## Notes

Not all numbers in a character are associated with a printable character.

You can use the Character Palette, which you can enable in International preferences, to view entire sets of characters and their codes.

You can use the CODE function to find the numeric code for a specific character.

---

### Examples

CHAR(98.6) returns "b", which is represented by the code 98.

CODE("b") returns 98.

---

## CHOOSE

The CHOOSE function uses a specified index value to retrieve a value from a set of values.

**CHOOSE**(*index*, *value*, [*value*, . . .])

- *index*: A numeric expression.
- *value*: One or more values, which can be text, a numeric expression, or a cell reference.

---

### Examples

If cells A1:A7 contain Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday:

CHOOSE(4, A1, A2, A3, A4, A5, A6, A7) returns Thursday.

CHOOSE(3, "1st", "second", 7, "last") returns 7, the third value in the list.

---

## CLEAN

The CLEAN function removes most common nonprinting characters (Unicode character codes 0–31) from text. This can be helpful if text you paste from another application contains unwanted question marks, spaces, boxes, or other unexpected characters.

**CLEAN**(*text*)

- *text*: The text from which you want to remove nonprinting characters.

## Notes

There are some less common nonprinting characters that are not removed by CLEAN (character codes 127, 129, 141, 143, 144, and 157). To remove these, you can use the SUBSTITUTE function to replace them with a code in the range 0–31 before you use the CLEAN function.

You can use the TRIM function to remove extra spaces in text.

---

### Examples

Suppose you copy what you believe to be the text "a b c d e f" from another application and paste it into cell A1, but instead see "a b c ? ?d e f". You can try using CLEAN to remove the unexpected characters:

CLEAN(A1) returns "a b c d e f".

---

## CODE

The CODE function returns the Unicode code number of the first character in a specified string.

**CODE**(*text*)

- *text*: A text expression or reference to a cell containing a text expression.

### Notes

You can use the Character Palette, which you can enable in International preferences, to view the code for a particular character.

You can use the CHAR function to do the opposite of the CODE function: convert a numeric code into a text character.

---

### Examples

CODE("A") returns 65, the character code for uppercase "A".

CODE("abc") returns 97 for lowercase "a".

CHAR(97) returns "a".

CODE(A3) returns "102" for lowercase "f".

CODE("Ń") gives 1488.

---

## COLUMN

The COLUMN function returns the column number of the specified cell or, if no cell is specified, the column number of the cell that contains the function.

**COLUMN**([*cell*])

- *cell*: Optional; a cell reference. If omitted, COLUMN returns the column number of the cell that contains the formula.

---

### Examples

COLUMN(B7) returns 2, the absolute column number of column B.

COLUMN() returns the column number of the cell that contains the function.

---

## COLUMNS

The COLUMNS function counts how many columns are in a range of cells.

**COLUMNS**(*cell-range*)

- *cell-range*: A range of cells in a table.

### Notes

If you select an entire row for *cell-range*, Numbers returns the total number of cells in the row, which changes when you resize the table.

---

### Examples

COLUMNS(B3:D10) returns 3, the number of columns in the range (columns B, C, and D).

COLUMNS(5:5) returns the total number of columns in row 5.

---

## COMBIN

The COMBIN function finds the number of different ways you can combine a number of items into groups of a specific size, ignoring the order within the groups.

**COMBIN**(*items, size*)

- *items*: The total number of items that can be combined.
- *size*: The number of items combined in each group.

### Notes

Remember that combinations are not the same as permutations. The order of the items in a group is ignored for combinations but not for permutations. For example, (1, 2, 3) and (3, 2, 1) are the same combination but two unique permutations.

---

### Examples

COMBIN(3, 2) returns 3, the number of unique groups you can create if you start with 3 items and group them 2 at a time.

COMBIN(3.2, 2.3) returns 3. Fractional parts are dropped.

Both COMBIN(5, 2) and COMBIN(5,3) return 10.

---

## CONCATENATE

The CONCATENATE function joins (concatenates) strings.

**CONCATENATE**(*string*, [*string*, ...])

- *string*: A string or a reference to a cell containing a string. To include a string in an argument, place quotation marks around it.

### Notes

You can also use the & operator to concatenate strings.

---

#### Examples

If cell A1 contains *Lorem* and cell B1 contains *Ipsum*, CONCATENATE(B1, ", ", A1) returns "Ipsum, Lorem".

CONCATENATE("a", "b", "c") returns "abc".

"a"&"b"&"c" returns "abc".

---

## CONFIDENCE

The CONFIDENCE function returns a value for creating a statistical confidence interval for a sample of a specified size from a population with a known standard deviation. The confidence estimate assumes that values in the sample are normally distributed.

**CONFIDENCE**(*alpha*, *stdev*, *size*)

- *alpha*: The probability that the true population value lies outside the interval. So, 1 minus alpha is the confidence level that the true population value lies within the interval centered on the sample value. An alpha of 0.05 corresponds to a confidence level of 0.95, or 95%.
- *stdev*: The standard deviation of the population.
- *size*: The size of the sample.

---

#### Examples

CONFIDENCE(0.05, 1, 10) returns 0.62. If the mean of the sample values is 100, then with 95% confidence the population mean falls in the range 99.38–100.62.

CONFIDENCE(0.1, 1, 10) returns 0.52. If the mean of the sample values is 100, then with 90% confidence the population mean falls in the range 99.48–100.52.

CONFIDENCE(0.05, 1, 20) returns 0.44.

CONFIDENCE(0.05, 1, 30) returns 0.36.

CONFIDENCE(0.05, 1, 40) returns 0.31.

---

## CORREL

The CORREL function calculates the correlation between two data sets based on linear regression analysis.

**CORREL**(*y-range*, *x-range*)

- *y-range*: A range of cells containing the dependent variable (y).
- *x-range*: A range of cells containing the independent variable (x).

---

### Examples

Given the following table:

	A	B	C	D	E	F
1						
2	2.1	3.4		1	2	
3	3.3	3.7		2	4	
4	4.5	4		3	6	
5	5.5	4.4		4	8	
6	6.4	5.1		5	10	
7	7.2	5.4		6	12	
8						

---

CORREL(D2:D7, E2:E7) returns 1.

---

CORREL(B2:B7, A2:A7) returns 0.977265.

---

## COS

The COS function calculates the cosine of an angle expressed in radians.

**COS**(*radian-angle*)

- *radian-angle*: A number representing an angle in radians.

### Notes

To work with angles in radians, use the RADIANS function to convert the degrees to radians. See the second example below.

To express radians as a multiple of pi, use the PI function. See the third and fourth examples below.

---

### Examples

COS(1) returns 0.540302306, the cosine of 1 radian (approximately 57.3 degrees).

---

COS(RADIANS(60)) returns 0.5, the cosine of 60 degrees.

---

COS(PI()/3) returns 0.5, pi/3 radians (60 degrees).

---

COS(PI()) returns -1, the cosine of pi radians (180 degrees).

---

## COSH

The COSH function calculates the hyperbolic cosine of a number.

**COSH**(*number*)

- *number*: Any real number.

---

### Examples

COSH(0) returns 1.

COSH(1) returns 1.543.

COSH(5) returns 74.21.

COSH(10) returns 11,013.233.

---

## COUNT

The COUNT function counts the number of arguments and referenced cells that contain numbers, numeric expressions, or dates.

**COUNT**(*value*, [*value*, ...])

- *value*: One or more numbers.

### Notes

To count any cell that contains any type of value (that is, any cell that is not empty), use the COUNTA function.

---

### Examples

Given the following table:

	A	B	C	D	E	F
1	100	200	300	400	500	
2	lorem	ipsum	dolor	sit	amet	
3	100	200	300	sit	amet	
4	TRUE	TRUE	FALSE	FALSE	FALSE	
5		200		400		
6						

COUNT(A1:E1) returns 5.

COUNT(A2:E2) returns 0.

COUNT(A3:E3) returns 3.

COUNT(A4:E4) returns 0.

COUNT(A5:E5) returns 2.

COUNT(1, SUM(4, 5)) returns 2.

---

## COUNTA

The COUNTA function counts the number of arguments and referenced cells that are not empty.

**COUNTA**(*value*, [*value*, ...])

- *value*: A reference to one or more cells or an argument containing a value.

### Notes

To count only cells or arguments that contain numbers or dates, use the COUNT function.

---

### Examples

Given the following table:

	A	B	C	D	E	F
1	100	200	300	400	500	
2	lorem	ipsum	dolor	sit	amet	
3	100	200	300	sit	amet	
4	TRUE	TRUE	FALSE	FALSE	FALSE	
5		200		400		
6						

---

COUNTA(A1:E1) returns 5.

---

COUNTA(A2:E2) returns 5.

---

COUNTA(A3:E3) returns 5.

---

COUNTA(A4:E4) returns 5.

---

COUNTA(A5:E5) returns 2.

---

COUNTA(1, "a", TRUE, FALSE) returns 4.

---

COUNTA(1, SUM(4, 5)) returns 2.

---

## COUNTBLANK

The COUNTBLANK function counts the number of cells in a range that are empty.

**COUNTBLANK**(*range*)

- *range*: A single range of cells.

---

### Examples

Given the following table:

	A	B	C	D	E	F
1	100	200	300	400	500	
2	lorem	ipsum	dolor		amet	
3	100		300		amet	
4	TRUE	TRUE		FALSE	FALSE	
5						
6						

---

COUNTBLANK(A1:E1) returns 0.

---

COUNTBLANK(A2:E2) returns 1.

---

COUNTBLANK(A3:E3) returns 2.

---

COUNTBLANK(A4:E4) returns 1.

---

COUNTBLANK(A5:E5) returns 5.

---

## COUNTIF

The COUNTIF function counts the number of cells in a range that satisfy a condition.

**COUNTIF**(*test-range*, *condition*)

- *test-range*: The range of cells to be tested.
- *condition*: The conditional test that results in a logical TRUE or FALSE.

### Notes

For more information on the comparison operators you can use in the conditional test, see "Understanding the Comparison Operators" on page 96.

---

### Examples

If cells A1:A8 contain 1, 2, 3, 4, 5, 6, 7, 8:

---

COUNTIF(A1:A8, "<4") returns 3.

---

COUNTIF(A1:A8, ">4") returns 4.

---

COUNTIF(A1:A8, ">=4") returns 5.

---

## COUPDAYBS

The COUPDAYBS function counts the number of days from the beginning of the coupon period in which settlement of a security occurs to the settlement date.

**COUPDAYBS**(*settle, maturity, frequency, [day-count]*)

- *settle*: The date of the settlement, usually the date when the security was purchased.
- *maturity*: The date the security matures (expires).
- *frequency*: The number of coupon payments each year.
  - 1 means annual payments.
  - 2 means semiannual payments (twice per year).
  - 4 means quarterly payments (four per year).
- *day-count*: Optional; specifies the number of days per month and days per year used in the calculations (sometimes called the day count basis).
  - 0 or omitted uses 30/360 (30 days for each month, 360 days in a year).
  - 1 uses actual/actual (the number of days shown on a calendar).
  - 2 uses actual/360 (calendar days for each month but 360 days per year).
  - 3 uses actual/365 (calendar days for each month but 365 days per year).
  - 4 uses 30E/360 (European 30/360).

---

### Examples

If A1:A4 contain 9/1/2000, 1/1/2001, 4, 1:

COUPDAYBS(A1, A2, A3, A4) returns 62 (the number of days from July 1, the beginning of the current coupon period, to September 1, on the basis of 31 days in July and August).

---

COUPDAYBS(A1, A2, A3, 0) returns 60 (the number of days for the same period as the previous example, but on the basis of 30 days per month).

---

COUPDAYBS(DATE(2000,7,4), A2, 2, 0) returns 3 (the number of days from July 1 to July 4).

---

## COUPDAYS

The COUPDAYS function counts the number of days in the coupon period in which settlement of a security occurs.

**COUPDAYS**(*settle, maturity, frequency, [day-count]*)

- *settle*: The date of the settlement, usually the date when the security was purchased.
- *maturity*: The date the security matures (expires).
- *frequency*: The number of coupon payments each year.
  - 1 means annual payments.
  - 2 means semiannual payments (twice per year).

4 means quarterly payments (four per year).

- *day-count*: Optional; specifies the number of days per month and days per year used in the calculations (sometimes called the day count basis).

0 or omitted uses 30/360 (30 days for each month, 360 days in a year).

1 uses actual/actual (the number of days shown on a calendar).

2 uses actual/360 (calendar days for each month but 360 days per year).

3 uses actual/365 (calendar days for each month but 365 days per year).

4 uses 30E/360 (European 30/360).

---

### Examples

If A1:A4 contain 9/1/2000, 1/1/2001, 4, 0:

COUPDAYS(A1, A2, A3, A4) returns 90 (the number of days in July, August, and September using the 30/360 day count basis).

---

COUPDAYS(A1, A2, A3, 1) returns 92 (the number of days in July, August, and September using the actual/actual day count basis).

---

COUPDAYS(A1, A2, A3, 2) returns 90 (the number of days in July, August, and September using the actual/360 day count basis).

---

COUPDAYS(A1, A2, A3, 3) returns 91.25 (the number of days in July, August, and September using the actual/365 day count basis).

---

COUPDAYS(A1, A2, A3, 4) returns 90 (the number of days in July, August, and September using the 30E/360 day count basis).

---

## COUPDAYSNC

The COUPDAYSNC function counts the number of days from the settlement date of a security to the end of the coupon period in which settlement occurs.

**COUPDAYBS**(*settle*, *maturity*, *frequency*, [*day-count*])

- *settle*: The date of the settlement, usually the date when the security was purchased.
- *maturity*: The date the security matures (expires).
- *frequency*: The number of coupon payments each year.
  - 1 means annual payments.
  - 2 means semiannual payments (twice per year).
  - 4 means quarterly payments (four per year).
- *day-count*: Optional; specifies the number of days per month and days per year used in the calculations (sometimes called the day count basis).
  - 0 or omitted uses 30/360 (30 days for each month, 360 days in a year).
  - 1 uses actual/actual (the number of days shown on a calendar).

- 2 uses actual/360 (calendar days for each month but 360 days per year).
- 3 uses actual/365 (calendar days for each month but 365 days per year).
- 4 uses 30E/360 (European 30/360).

---

### Examples

If A1:A4 contain 9/1/2000, 1/1/2001, 4, 1:

COUPDAYSNC(A1, A2, A3, A4) returns 30 (the number of days from September 1 to the next coupon date, October 1, on the basis of 30 days in September).

---

COUPDAYSNC(DATE(2000,8,1), A2, A3, A4) returns 61 (the number of days from August 1 to the next coupon date, October 1, on the basis of 31 days in August and 30 days in September).

---

COUPDAYSNC(DATE(2000,8,1), A2, A3, 0) returns 60 (the number of days from August 1 to the next coupon date, October 1, on the basis of 30 days in August and 30 days in September).

---

## COUPNUM

The COUPNUM function counts the coupons to be paid for a security between the settlement date and the maturity date.

**COUPNUM**(*settle, maturity, frequency, [day-count]*)

- *settle*: The date of the settlement, usually the date when the security was purchased.
- *maturity*: The date the security matures (expires).
- *frequency*: The number of coupon payments each year.
  - 1 means annual payments.
  - 2 means semiannual payments (twice per year).
  - 4 means quarterly payments (four per year).
- *day-count*: Optional; specifies the number of days per month and days per year used in the calculations (sometimes called the day count basis).
  - 0 or omitted uses 30/360 (30 days for each month, 360 days in a year).
  - 1 uses actual/actual (the number of days shown on a calendar).
  - 2 uses actual/360 (calendar days for each month but 360 days per year).
  - 3 uses actual/365 (calendar days for each month but 365 days per year).
  - 4 uses 30E/360 (European 30/360).

---

### Examples

If A1:A4 contain 2/1/2000, 1/1/2001, 4, 0:

COUPNUM(A1, A2, A3, A4) returns 4.

---

COUPNUM(DATE(2000,6,1), A2, A3, A4) returns 3.

---

COUPNUM(DATE(2000,9,1), A2, A3, A4) returns 2.

---

COUPNUM(DATE(2000,11,1), A2, A3, A4) returns 1.

---

## COVAR

The COVAR function calculates the covariance of two data sets.

**COVAR**(*range1*, *range2*)

- *range1*: A reference to the cells containing the first data set.
- *range2*: A reference to the cells containing the second data set. The dimensions of *range1* and *range2* must be the same.

### Notes

If the two data sets are identical, the covariance is the same as the population variance.

---

### Examples

If *range1* (C3:H3) contains 3.4, 3.7, 4, 4.4, 5.1, 5.4 and *range2* (C2:H2) contains 2.1, 3.3, 4.5, 5.5, 6.4, 7.2:

COVAR(C3:H3, C2:H2) returns 1.234.

---

## DATE

The DATE function combines separate year, month, and day values into a single date.

**DATE**(*year*, *month*, *day*)

- *year*: A year number.
- *month*: A month number.
- *day*: A day number.

### Notes

Year values aren't converted. If you specify 10, the year 10 is evaluated, not the year 1910 or 2010.

---

### Examples

DATE(1959,2,14) returns Feb 14, 1959, which is displayed according to the cell's current format.

---

## DATEDIF

The DATEDIF function finds the number of days, months, or years between two dates.

**DATEDIF**(*start-date*, *end-date*, *method*)

- *start-date*: The starting date.
- *end-date*: The ending date.
- *method*: Specifies whether the time difference is expressed in years, months, or days and how the calculation handles dates in different years or months:
  - "D" counts the days between the dates.
  - "M" counts the months between the dates.
  - "Y" counts the years between the dates.
  - "MD" counts the days between the starting and ending days of the month, ignoring months and years. If the starting day is after the ending day, the count starts from the ending day as if it were in the preceding month. The year of the end-date is used to check for a leap year.
  - "YM" counts the number of whole months between *start-date* and *end-date*, ignoring the year. If the starting month/day is before the ending month/day, the dates are treated as though they are in the same year. If the starting month/day is after the ending month/day, the dates are treated as though they are in consecutive years.
  - "YD" counts the number of days between the starting month/day and ending month/day, ignoring years.

---

### Examples

If A1 contains "4/6/88" and A2 contains "10/30/06" then:

---

DATEDIF(A1,A2,"D") returns 6781, the number of days between April 6, 1988, and October 30, 2006.

---

DATEDIF(A1,A2,"M") returns 222, the number of whole months between April 6, 1988, and October 30, 2006.

---

DATEDIF(A1,A2,"Y") returns 18, the number of whole years between April 6, 1988, and October 30, 2006.

---

DATEDIF(A1,A2,"MD") returns 24, the number of days between the sixth day of a month and the thirtieth day of the same month.

---

DATEDIF(A1,A2,"YM") returns 6, the number of months between April and the following October in any year.

---

DATEDIF(A1,A2,"YD") returns 207, the number of days between April 6 and the following October 30 in any year.

---

DATEDIF(A1,NOW(),"Y") & " years, " & DATEDIF(A1,NOW(),"YM") & " months, and " & DATEDIF(A1,NOW(),"MD") & " days" returns the current age of someone born on April 6, 1988.

---

## DAY

The DAY function extracts the day number from a date.

**DAY**(*date-time*)

- *date-time*: Any valid Numbers date.

---

### Examples

DAY("4/6/88 11:59:22 AM") returns 6.

---

## DB

The DB function calculates the depreciation of an asset for a specified period using the fixed-declining balance method.

**DB**(*cost, salvage, life, period, [first-year-months]*)

- *cost*: The initial cost of the asset.
- *salvage*: The salvage value of the asset.
- *life*: The number of periods over which the asset is depreciating.
- *period*: The period for which you want to calculate the depreciation.
- *first-year-months*: Optional; the number of months in the first year. If omitted, 12 is assumed.

---

### Examples

If A2:E2 contain 1000, 100, 4,1,12:

DB(A2, B2, C2, D2, E2) returns \$438.

DB(A2, B2, C2, 2, E2) returns \$246.16.

DB(A2, B2, C2, 3, E2) returns \$138.34.

DB(A2, B2, C2, 4, E2) returns \$77.75.

DB(A2, B2, C2, D2, 9) returns \$328.50.

DB(A2, B2, C2, D2, 6) returns \$219.

DB(A2, B2, C2, D2, 3) returns \$109.50.

---

## DDB

The DDB function calculates the depreciation of an asset based on a specified depreciation rate. If you don't specify a rate, it defaults to the double-declining balance method.

**DDB**(*cost, salvage, life, period, [factor]*)

- *cost*: The initial cost of the asset.
- *salvage*: The salvage value of the asset.
- *life*: The number of periods over which the asset is depreciating.
- *period*: The period for which you want to calculate the depreciation. Must use the same time units as *life*.
- *factor*: Optional; a number that determines the depreciation rate. The higher the number, the more rapid the depreciation. If omitted, 2 (for double-declining) is assumed.

---

### Examples

DDB(1000, 100, 4, 1) returns \$500.

DDB(1000, 100, 4, 2) returns \$250.

DDB(1000, 100, 4, 3) returns \$125.

DDB(1000, 100, 4, 4) returns \$25.

DDB(1000, 100, 4, 1, 1) returns \$250.

DDB(1000, 100, 4, 1, 3) returns \$750.

DDB(1000, 100, 4, 2, 3) returns \$150.

DDB(1000, 100, 4, 3, 3) returns \$0.

---

## DEGREES

The DEGREES function converts radians to degrees.

**DEGREES**(*radians*)

- *radians*: A number representing the size of the angle in radians.

---

### Examples

DEGREES(PI()) returns 180 (pi radians = 180 degrees).

DEGREES(1) returns 57.2957795130823, which is approximately the number of degrees per radian.

---

## DISC

The DISC function calculates the discount rate of a security.

**DISC**(*settle, maturity, price, value, [day-count]*)

- *settle*: The date of the settlement, usually the date when the security was purchased.
- *maturity*: The date the security matures (expires).
- *price*: The cost of the security per \$100 par value.
- *value*: The redemption value per \$100 par value.
- *day-count*: Optional; specifies the number of days per month and days per year used in the calculations (sometimes called the day count basis).
  - 0 or omitted uses 30/360 (30 days for each month, 360 days in a year).
  - 1 uses actual/actual (the number of days shown on a calendar).
  - 2 uses actual/360 (calendar days for each month but 360 days per year).
  - 3 uses actual/365 (calendar days for each month but 365 days per year).
  - 4 uses 30E/360 (European 30/360).

---

### Examples

If A1:E1 contain 1/1/2000, 1/1/2001, 90, 100, 0:

DISC(A1, B1, C1, D1, E1) returns 10%.

---

DISC(A1, B1, 80, D1, E1) returns 20%.

---

DISC(A1, B1, C1, 110, E1) returns 18%.

---

## DOLLAR

The DOLLAR function converts a number to a string written as a dollar amount with the specified number of decimal places.

**DOLLAR**(*number, [places]*)

- *number*: The number you want to convert. It can be a number, numeric expression, or a reference to a cell containing a numeric expression.
- *places*: Optional; a positive number represents the number of digits you want to have to the right of the decimal point. If omitted, 2 is assumed. A negative number specifies digits to round to the left of the decimal point.

### Notes

The DOLLAR function uses standard arithmetical rounding; if the most significant digit being dropped is 5 or greater, the result is rounded up.

---

### Examples

DOLLAR(2323.124) returns \$2,323.12.

---

DOLLAR(2323.125) returns \$2,323.13.

---

DOLLAR(99.554, 0) returns \$100.

---

DOLLAR(12, 3) returns \$12.000.

---

DOLLAR(-12, 3) returns (\$12.000), with parentheses indicating a negative amount.

---

DOLLAR(123, -1) returns \$120.

---

## EDATE

The EDATE function finds a new date some number of months before or after a given date.

**EDATE**(*date*, *month-offset*)

- *date*: The starting date.
- *month-offset*: The number of months before or after *date*. The *month-offset* is negative for a date earlier than *date*.

---

### Examples

EDATE("1/15/2000", 1) returns 2/15/2000, the date one month later.

---

EDATE("1/15/2000", -24) returns 1/15/1998, the date 24 months earlier.

---

## EVEN

The EVEN function rounds a number away from zero to the next even number.

**EVEN**(*number*)

- *number*: The number you want to round. It can be a number, a numeric expression, or a reference to a cell containing a numeric expression.

### Notes

To round to an odd number, use the ODD function.

---

### Examples

EVEN(1) returns 2.

---

EVEN(2) returns 2.

---

EVEN(2.5) returns 4.

---

EVEN(-2.5) returns -4.

---

EVEN(0) returns 0.

---

## EXACT

The EXACT function returns TRUE if the argument strings are identical in case and characters.

**EXACT**(*string1*, *string2*)

- *string1*: A text expression. To include the string as the argument, place quotation marks around it.
- *string2*: The second text expression.

---

### Examples

EXACT("toledo", "toledo") returns TRUE.

EXACT("Toledo", "toledo") returns FALSE.

EXACT(toledo, "to" & "edo") returns TRUE.

---

## EXP

The EXP function calculates e to the power of a number.

**EXP**(*number*)

- *number*: The power to which you want to raise e. It can be a number, a numeric expression, or a reference to a cell containing a numeric expression.

---

### Examples

EXP(1) returns 2.71828182845905, an approximation of e.

EXP(LN(5)) returns 5. EXP is the inverse of the LN function.

---

## FACT

The FACT function calculates the factorial of a nonnegative number.

**FACT**(*number*)

- *number*: A nonnegative number.

### Notes

Any fractional part of *number* is truncated before the calculation.

---

### Examples

FACT(5) returns 120, or  $1 * 2 * 3 * 4 * 5$ .

FACT(0) returns 1.

FACT(4.5) returns 24. The fraction is dropped and 4! computed.

FACT(-1) returns an error; the number must be nonnegative.

---

## FALSE

The FALSE function returns the Boolean value FALSE. It is included so you can use spreadsheets created with some older spreadsheet applications. You can specify a Boolean value of FALSE by simply typing "false" (without quotation marks) into a cell or function argument.

### FALSE()

- No arguments (but you must include the parentheses).

### Notes

You can type the word FALSE into a cell or formula instead of using the FALSE() function.

---

### Examples

FALSE() returns the Boolean value FALSE.

AND(1,FALSE()) returns the Boolean value FALSE.

---

## FIND

The FIND function finds the starting position of one string within another. The search is case sensitive and spaces are counted. Wildcards are not allowed.

### FIND(*target*, *string*, [*start*])

- *target*: The text you want to find. If you're including the actual text as the argument, surround it with quotation marks.
- *string*: The text you want to search. If you're including the actual text as the argument, surround it with quotation marks.
- *start*: Optional; a number specifying the character position in the target string where you want to start the search. If omitted, the search starts with the first character in *target*.

### Notes

To use wildcards in your search, use the SEARCH function.

---

### Examples

FIND("e","where on earth") returns 3 ("e" is the third character in the string "where on earth").

FIND("e","where on earth",8) returns 10 ("e" in earth is the first "e" found starting from character 8, the "n" in "on").

---

## FIXED

The FIXED function rounds a number to the specified number of decimal places and then converts the result to text.

**FIXED**(*number*, [*places*], [*commas*])

- *number*: A number.
- *places*: Optional; a number specifying the number of decimal places you want in the result.
- *commas*: Optional Boolean value; specifies whether to use position separators in the whole portion of the resulting number.
  - FALSE or 0 leaves out position separators in the resulting number.
  - TRUE, 1, or omitted includes position separators in the resulting number.

---

### Examples

FIXED(6789.123, 2) returns "6,789.12."

---

FIXED(6789.123, 1, 1) returns "6789.1."

---

FIXED(6789.123, -2) returns "6,800."

---

FIXED(12.4, 0) returns "12."

---

FIXED(12.5, 0) returns "13."

---

FIXED(4, -1) returns "0."

---

FIXED(5, -1) returns "10."

---

## FLOOR

The FLOOR function rounds a number toward zero to the nearest multiple of the specified factor.

**FLOOR**(*number*, *factor*)

- *number*: A number, numeric expression, or reference to a cell containing a numeric expression.
- *factor*: The number whose multiples you want to round to. *factor* must have the same sign as *number*.

### Notes

To round away from zero instead of toward zero, use the CEILING function.

Other functions related to rounding numbers: INT, ROUND, ROUNDUP, ROUNDDOWN, TRUNC.

---

### Examples

FLOOR(0.25,1) returns 0.

FLOOR(1.25,1) returns 1.

FLOOR(5,2) returns 4.

FLOOR(73,10) returns 70.

FLOOR(-0.25,-1) returns 0.

FLOOR(9,2.5) returns 7.5.

---

## FORECAST

The FORECAST function uses linear regression analysis of known value pairs to find the  $y$  (dependent) value that corresponds to a chosen  $x$  (independent) value.

**FORECAST**( $x$ ,  $y$ -values,  $x$ -values)

- $x$ : The  $x$  value for which you want to find a corresponding  $y$  value.
- $y$ -values: A range of cells containing the known  $y$  values. Must be the same size as  $x$ -values.
- $x$ -values: A range of cells containing the known  $x$  values.

### Notes

You can use the SLOPE and INTERCEPT functions to find the equation used to calculate forecast values.

---

### Examples

Given the following table:

	A	B	C	D	E	F
1						
2	1	2	3	4	5	6
3	3	5	7	9	11	13
4						

FORECAST(9, A3:F3, A2:F2) returns 19.

---

## FV

The FV function calculates the future value of an investment, given a series of fixed, periodic added payments, interest rate, and number of periods. FV stands for future value.

**FV**( $rate$ ,  $num$ -periods, [ $payment$ ], [ $present$ -value], [ $when$ -due])

- $rate$ : The interest rate per period.
- $num$ -periods: The number of periods.
- $payment$ : Optional; the added payment to be made per period, specified as a negative number. If omitted, you must include  $present$ -value.

- *present-value*: Optional; the present value of the investment, specified as a negative number.
- *when-due*: Optional; specifies whether payments are due at the beginning or end of each period:
  - 0 (or omitted) means payments are at the end of each period.
  - 1 means payments are at the beginning of each period.

---

### Examples

FV(5%,10,-300,-3000,0) calculates the value in 10 years of a \$3000 initial investment, with an added payment of \$300 at the end of each year, at an annual rate of 5%. The future value in this example is \$8660.05 (when using a number format with a precision of 2).

---

## GCD

The GCD function finds the greatest common divisor of the specified numbers. Sometimes called the greatest common factor, the greatest common divisor is the largest integer that divides each of the numbers with no remainder.

**GCD**(*number*, [*number*, ...])

- *number*: One or more positive numbers or numeric expressions, or references to cells containing positive numbers or numeric expressions.

### Notes

All arguments must be greater than or equal to zero.

---

### Examples

GCD(8, 10) returns 2.

GCD(99, 102, 105) returns 3.

GCD(34, 51) returns 17.

---

## HLOOKUP

The HLOOKUP function retrieves a value from a range of rows by using the top row values to pick a column and a row number to pick a row. You can specify whether to search for the closest match or an exact match.

**HLOOKUP**(*search-value*, *cell-range*, *row*, [*exact-match*])

- *search-value*: The value you want to look for in the top row to choose a column. Can be numeric, textual, or logical.
- *cell-range*: The range of cells containing your data. The top row contains the data to be searched; the remaining rows contain values you want to retrieve.
- *row*: A numeric expression that specifies the row that contains the value you want to retrieve. The top row of the cell range is row 1.

- *exact-match*: Optional Boolean value; determines whether an exact match is required:  
 TRUE, 1, or omitted selects the column with the largest top-row value that is less than the search value if there is no exact match.  
 FALSE or 0 returns an error if there is no exact match.

---

### Examples

Given the following table:

	A	B	C	D	E	F
1	0	20	40	60	80	
2	A	E	I	O	U	
3	lorem	ipsum	dolor	sit	amet	
4	1	2	3	4	5	
5						

---

HLOOKUP(20,A1:E4,2) returns "E."

---

HLOOKUP(39,A1:E4,2) returns "E."

---

HLOOKUP("M",A2:E4,2) returns "dolor."

---

HLOOKUP("C",A2:E3,2) returns "lorem."

---

HLOOKUP("blandit",A3:E4,2) returns "5."

---

HLOOKUP("C",A2:E4,3,TRUE) returns "1."

---

HLOOKUP("C",A2:E4,3,FALSE) warns that the value can't be found (because there is no exact match).

---

## HOUR

The HOUR function extracts the hour from a date/time value. The hour is represented, using a 24-hour clock, by a number from 0 through 23.

**HOUR**(*date-time*)

- *date-time*: Any valid Numbers date.

---

### Examples

HOUR(NOW()) returns the current hour of the day.

---

HOUR("4/6/88 11:59:22 AM") returns 11.

---

## HYPERLINK

The HYPERLINK function creates a clickable link that opens a webpage or new email message window.

**HYPERLINK**(*url*, [*link-text*])

- *url*: A standard universal resource locator.
- *link-text*: Optional; the text that appears as a clickable link in the cell. If you omit this argument, the URL is used as the link text.

---

### Examples

HYPERLINK("http://www.apple.com","Apple") creates a link with the text *Apple* that opens the default web browser to the Apple homepage.

HYPERLINK("mailto:janedoe@example.com?subject=Quote Request","Get Quote") creates a link with the text *Get Quote* that opens the default email application and addresses a new message to janedoe@example.com with the subject line *Quote Request*.

---

## IF

The IF function returns one of two values depending on whether a specified expression is TRUE or FALSE.

**IF**(*expression*, [*if-true*], [*if-false*])

- *expression*: A logical or numeric expression, or a reference to a cell containing such an expression.
- *if-true*: Optional; the value that is returned if *condition* is true. If completely omitted (no comma), returns 1. If blank (comma but not value), returns TRUE.
- *if-false*: Optional; the value that is returned if *condition* is false. If completely omitted (no comma), the *if-true* expression is returned. If blank (comma but not value), returns FALSE.

### Notes

If *condition* is a numeric expression, a value of 0 is interpreted as false and any nonzero value is interpreted as true.

---

### Examples

IF(A5>=0,"Nonnegative","Negative") returns the text "Nonnegative" if cell A5 contains a number greater than or equal to zero. Otherwise, it returns "Negative".

IF(AND(A8,A9),1,0) behaves like the Boolean AND operation. The function returns the numeric value 1 when both cells A8 and A9 contain 1 but returns the numeric value 0 if either cell contains a zero.

---

## INDEX

The INDEX function retrieves the value in the cell located at the intersection of the specified row and column within a range of cells. You specify the location by indicating how many rows down and how many columns to the right the cell is in relation to the upper-left corner of the range.

**INDEX**(*cell-range*, [row], [column], [area])

- *cell-range*: A range or list of ranges containing the values you want to return. If more than one range is given (specified in a list surrounded by parentheses), the area argument specifies which range to give a result from.
- *row*: Optional; the number of the cell's row, counting from top to bottom with the topmost cell in the cell range numbered 1. If omitted, you must include *column*.
- *column*: Optional; the number of the cell's column, counting from left to right with the leftmost cell in the cell range numbered 1. If omitted, you must include *row*.
- *area*: Optional; the number of the area in *cell-range* if it includes more than one.

---

### Examples

Given the following table:

	A	B	C	D	E	F
1						
2		2	4	8	16	
3		32	64	128	256	
4		512	1024	2048	4096	
5		8192	16384	32768	65536	
6						

---

INDEX(B2:E5,1,1) returns 2.

---

INDEX(B2:E5,3,2) returns 1024.

---

INDEX(B2:E5,2,3) returns 128.

---

INDEX(B2:E5,1,5) returns an error because the range contains only four columns.

---

## INDIRECT

The INDIRECT function returns a reference to an address specified as a string.

**INDIRECT**(*address*, [style])

- *address*: A string representing a cell address or a reference to a cell that contains a cell address.
- *style*: Optional; address style used in *address*.
  - TRUE, 1, or omitted indicates the A1 style address.
  - FALSE or 0 returns an error indicating that the R1C1 style isn't supported.

---

### Examples

If cell A1 contains 99 and A20 contains A1, then:

INDIRECT(A20) returns 99, the contents of cell A1.

---

## INT

INT returns the nearest integer that is less than or equal to the number.

INT(*number*)

- *number*: The number you want to convert to an integer. It can be a number, a numeric expression, or a reference to a cell containing a numeric expression.

### Notes

Other functions related to rounding numbers: CEILING, ROUND, ROUNDUP, ROUNDDOWN, TRUNC.

---

### Examples

INT(1.49) returns 1.

INT(1.50) returns 1.

INT(1.23456) returns 1.

INT(1111.222) returns 1111.

INT(-2.2) returns -3.

INT(-2.8) returns -3.

---

## INTERCEPT

The INTERCEPT function calculates the y-intercept of the best-fit line for the data set using linear regression analysis.

INTERCEPT(*y-range*, *x-range*)

- *y-range*: A list of values for the dependent variable y. Must be the same size as x-range.
- *x-range*: A range of cells containing values for the independent variable x. Must be the same size as y-range.

### Notes

To find the slope of the best-fit line, use the SLOPE function.

---

## Examples

Given the following table:

	A	B	C	D	E	F
1	1	2	3	4	5	6
2	3	5	7	9	11	13
3						
4	2.1	3.3	4.5	5.5	6.4	7.2
5	3.4	3.7	4	4.4	5.1	5.4
6						
7						

---

INTERCEPT(A2:F2, A1:F1) returns 1.

---

SLOPE(A2:F2, A1:F1) returns 2.

---

INTERCEPT(A5:F5, A4:F4) returns 2.392.

---

## IPMT

The IPMT function calculates the interest portion of a payment for a loan or investment at a specified period based on fixed, periodic payments and a fixed interest rate.

**IPMT**(*rate*, *period*, *num-periods*, *present-value*, [*future-value*], [*when-due*])

- *rate*: The interest rate for each period.
- *period*: The period for which you want to find the interest.
- *num-periods*: The number of periods in the life of the investment.
- *present-value*: The present value of the loan or investment.
- *future-value*: Optional; the target future value, if this in an investment. If omitted, assumed to be 0.
- *when-due*: Optional; specifies whether payments are made at the beginning or end of each period:
  - 0 (or omitted) means payments are at the end of each period.
  - 1 means payments are at the beginning of each period.

## Notes

Be sure that the interest rate is expressed as the rate per period. For example, if the interest rate is 10% per year and the payment period is monthly, the rate used in the function should be 0.1/12 (approximately 0.00833 per month).

---

## Examples

To find the interest portion of the first payment on a \$1000 loan at 12% annual interest with payments due at the end of each month:

IPMT(0.12/12, 1, 12, 1000) returns -\$10.

---

## IRR

The IRR function calculates the internal rate of return for an investment that is based on a series of potentially irregular cash flows rather than fixed-interest income. The rate returned is the rate that makes the net present value of a series of cash flows 0.

**IRR**(*flows-range*, [*estimate*])

- *flows-range*: A range of cells that contain cash flow values. Positive values represent income. Negative values represent expenditures. All values must represent equal time intervals.
- *estimate*: Optional; an initial estimate for the rate of return. If omitted, 10% is used. Try adjusting the estimate if IRR fails to return a result.

---

### Examples

If cells A1:F1 contain -1000, 50, 50, 50, 50, 1050:

IRR(A1:F1) returns 5%, the rate of return if you invest \$1,000 and receive \$50 per year for 4 years and a final payment of \$1,050 in the fifth year.

---

To find the rate of return if you pay \$20,000 for a machine, run the machine for 5 years generating \$8,000 per year, and then sell the machine at the end of the fifth year for \$2,000, enter -20000, 8000, 8000, 8000, 8000, 10000 in cells A1:A6 and use the formula IRR(A1:A6). The value 30.06% is returned.

---

## ISBLANK

The ISBLANK function returns TRUE if the specified cell is empty and FALSE otherwise.

**ISBLANK**(*cell*)

- *cell*: A reference to a table cell.

---

### Examples

Given the following table:

	A	B	C	D	E	F
1						
2		100				
3						

---

ISBLANK(A1) returns TRUE.

---

ISBLANK(B2) returns FALSE.

---

## ISERROR

The ISERROR function returns TRUE if the expression in the function's argument evaluates to an error and FALSE otherwise.

**ISERROR**(*cell*)

- *cell*: A reference to a table cell that contains a formula.

---

### Examples

If cell A1 contains =QUOTIENT(3,0):

ISERROR(A1) returns TRUE. (You can't divide by 0.)

---

## ISEVEN

The ISEVEN function returns TRUE if the value is even (leaves no remainder when divided by 2) and FALSE otherwise.

**ISEVEN**(*number*)

- *number*: A number, numeric expression, or reference to a cell containing a numeric expression.

### Notes

Fractional parts of a number are ignored.

Dates are not considered even or odd; if *value* is a date, an error is returned.

---

### Examples

ISEVEN(2) returns TRUE.

---

ISEVEN(2.75) returns TRUE.

---

ISEVEN(3) returns FALSE.

---

## ISODD

The ISODD function returns TRUE if the value is odd (leaves a remainder when divided by 2) and FALSE otherwise.

**ISODD**(*number*)

- *number*: A number, numeric expression, or reference to a cell containing a numeric expression.

### Notes

Fractional parts of a number are ignored.

Dates are not considered even or odd; if *value* is a date, an error is returned.

---

### Examples

ISODD(3) returns TRUE.

---

ISODD(3.75) returns TRUE.

---

ISODD(2) returns FALSE.

---

## ISPMT

The ISPMT function calculates the interest due for a particular payment period of an investment.

**ISPMT**(*rate, period, num-periods, present-value*)

- *rate*: The interest rate for each period.
- *period*: The period for which you want to find the interest.
- *num-periods*: The number of periods in the life of the investment.
- *present-value*: The present value of the loan or investment.

### Notes

This function, which duplicates the capabilities of the IPMT function, helps you to use spreadsheets from older spreadsheet applications.

Be sure that the interest rate is expressed as the rate per period. For example, if the interest rate is 10% per year and the payment period is monthly, the rate used in the function should be 0.1/12 (approximately 0.00833 per month).

---

### Examples

To find the interest portion of the first payment on a \$1000 loan at 12% annual interest with payments due at the end of each month:

IPMT(0.12/12, 1, 12, 1000) returns -\$10.

---

## LARGE

The LARGE function retrieves the *n*th-largest value within a range. The largest value is ranked number 1.

**LARGE**(*range, n*)

- *range*: The array of cells containing the values.
- *n*: A number representing the size ranking of the value you want to retrieve (1 is largest, 2 is second-largest, and so on).

### Notes

If *n* is omitted, is less than or equal to 0, or is greater than the number of values in the range, an error is returned.

---

## Examples

Given the following table:

	A	B	C	D	E	F
1						
2	30	20	50	10	40	
3						

---

LARGE(A2:E2, 1) returns 50, the largest value in the range.

---

LARGE(A2:E2, 2) returns 40, the second-largest value in the range.

---

LARGE(A2:E2, 5) returns 10, the fifth-largest value in the range.

---

LARGE(A2:E2) displays an error; you must specify n.

---

LARGE(A2:E2, 0) displays an error; n must be greater than 0.

---

LARGE(A2:E2, 6) displays an error; you can't find the sixth out of five values.

---

## LCM

The LCM function finds the least common multiple of the specified numbers. Sometimes called the lowest or smallest common multiple, the least common multiple is the smallest integer that is a multiple of the specified numbers.

**LCM**(*number*, [*number*, . . .])

- *number*: Zero or one or more positive numbers or numeric expressions, or references to cells containing positive numbers or numeric expressions. Fractional parts are ignored. Negative numbers are not allowed.

---

## Examples

LCM(2, 3) returns 6.

---

LCM(34, 68) returns 68.

---

LCM(30, 40, 60) returns 120.

---

LCM(30, 25, 40, 333, 60, 5) returns 120 (the fractional parts are ignored).

---

LCM(2, -3) displays an error (negative numbers are not allowed).

---

## LEFT

The LEFT function retrieves the specified number of characters from the left end of a string.

**LEFT**(*text*, [*length*])

- *text*: A text expression.
- *length*: Optional; the number of characters to retrieve. If omitted, the leftmost character is retrieved.

---

### Examples

LEFT("one two three", 2) returns "on".

LEFT("abc") returns "a".

---

## LEN

The LEN function counts the number of characters in a string. The count includes all spaces, numbers, and special characters.

**LEN**(*text*)

- *text*: A text expression.

---

### Examples

LEN("12345") returns 5.

LEN(" abc def ") returns 15, the sum of the six letters plus the three leading, three trailing, and three separating spaces.

---

## LN

The LN function calculates the natural logarithm of a number, the power to which e must be raised to produce the number.

**LN**(*number*)

- *number*: A positive number, a numeric expression, or a reference to a cell containing a positive numeric expression.

---

### Examples

LN(2.71828) returns approximately 1, the power to which e must be raised to produce 2.71828.

LN(EXP(1)) returns 1. LN is the inverse of the EXP function.

---

## LOG

The LOG function calculates the logarithm of a number with a specified base.

**LOG**(*number*, [*base*])

- *number*: A positive number.
- *base*: Optional; a positive number not equal to 1. If omitted, 10 is used.

---

### Examples

LOG(8, 2) returns 3.

---

LOG(100, 10) and LOG(100) both return 2.

---

LOG(5.0625, 1.5) returns 4.

---

## LOG10

The LOG10 function calculates the base-10 logarithm of a number.

**LOG10**(*number*)

- *number*: A positive number.

### Notes

To find the logarithm for a base other than 10, use the LOG function.

---

### Examples

LOG10(1) returns 0.

---

LOG10(10) returns 1.

---

LOG10(100) returns 2.

---

LOG10(1000) returns 3.

---

## LOOKUP

The LOOKUP function finds a match to your search value in one range, then retrieves the value in the cell with the same relative position in a second range.

**LOOKUP**(*search-value*, *search-range*, [*result-range*])

- *search-value*: The text or numeric expression you want to search for in the search range.
- *search-range*: The range of cells that you want to search for the search value.
- *result-range*: Optional; If omitted, the result is returned from the last row or column of search-range, whichever is the longer dimension.

---

## Examples

Given the following table:

	A	B	C	D	E	F
1	A	B	C	D	E	F
2	10	20	30	40	50	60
3						
4						

---

LOOKUP("C", A1:F1, A2:F2) returns 30.

---

LOOKUP(40, A2:F2, A1:F1) returns D.

---

LOOKUP("B", A1:C1, D2:F2) returns 50.

---

## LOWER

The LOWER function converts uppercase characters in text to lowercase.

### LOWER(*text*)

- *text*: A text expression or reference to a cell containing a text expression.

---

## Examples

LOWER("UPPER") returns "upper".

---

LOWER("Lower") returns "lower".

---

LOWER("MiXeD") returns "mixed".

---

## MATCH

The MATCH function finds the position of a value within a row or column range. Cell numbering starts with 1 at the top or left cell for vertical and horizontal ranges, respectively. Searches are performed top-to-bottom and left-to-right.

### MATCH(*search-value*, *cell-range*, [*method*])

- *search-value*: The text or numeric expression you want to find.
- *cell-range*: A range of cells within a single row or column.
- *method*: Optional; specifies how value matching is performed:
  - 1 (or omitted) matches the cell containing the largest value less than or equal to *search-value*.
  - 0 matches the first cell with a value that matches *search-value* exactly.
  - 1 matches the cell containing the smallest value greater than or equal to *search-value*.

## Notes

When searching for text, case is ignored.

MATCH works only on a range that is part of a single row or column; you can't use it to search a two-dimensional table.

---

## Examples

Given the following table:

	A	B	C	D	E	F
1	10		lorem			40
2	20		ipsum			20
3	30		lorem			30
4	40		borem			50
5	50		facit			10
6						

---

MATCH(40, A1:A5) returns 4.

---

MATCH(40, E1:E5) returns 1.

---

MATCH(35, E1:E5, 1) returns 3 (30 is the largest value less than or equal to 35).

---

MATCH(35, E1:E5, -1) returns 1 (40 is the smallest value greater than or equal to 35).

---

MATCH(35, E1:E5, 0) displays an error (no exact match can be found).

---

## MAX

The MAX function finds the largest number in a set.

**MAX**(*number*, [*number*, ...])

- *number*: A series of numbers, numeric expressions, or references to cells containing numbers or numeric expressions.

## Notes

Cells that don't contain numbers are ignored.

Text entered directly in the arguments results in an error.

---

## Examples

---

MAX(5, 5, 5, 5, 6) returns 6.

---

MAX(1, 2, 3, 4, 5) returns 5.

---

## MAXA

The MAXA function finds the largest number in a set of values. In addition to numeric values, text values and logical FALSE are counted as 0 and logical TRUE is counted as 1.

**MAXA**(*value*, [*value*, ...])

- *value*: A series of numbers or numeric expressions, or references to cells containing numbers, numeric expressions, text, or Boolean values.

### Notes

Text entered directly in the arguments results in an error.

---

### Examples

MAXA(1, 2, 3, 4) returns 4.

MAXA(A1:C1), where A1:C1 contains -1, -10, hello, returns 0.

---

## MEDIAN

The MEDIAN function finds the median value in a set of numbers. The median is the “middle” value in the sense that half the numbers in the set are less than the median and half are greater.

**MEDIAN**(*number*, [*number*, ...])

- *number*: A series of numbers, numeric expressions, or references to cells containing numbers or numeric expressions.

### Notes

If there is an even number of values in the set, the MEDIAN function returns the average of the two middle values.

---

### Examples

MEDIAN(1, 2, 3, 4, 5) returns 3.

MEDIAN(1, 2, 3, 4, 5, 6) returns 3.5.

MEDIAN(5, 5, 5, 5, 6) returns 5.

---

## MID

The MID function extracts the specified number of characters from a string starting at the specified position.

**MID**(*text*, *start*, *length*)

- *text*: A text expression.
- *start*: The number of the first character to extract. Position 1 is the first character in the string.
- *length*: The number of characters to extract.

---

### Examples

MID("lorem ipsum dolor sit amet",7,5) returns "ipsum".

---

MID("1234567890",4,3) returns "456".

---

MID("shorten", 5, 20) returns "ten".

---

## MIN

The MIN function finds the smallest number in the list of arguments.

**MIN**(*number*, [*number*, . . .])

- *number*: A series of numbers, numeric expressions, or references to cells containing numbers or numeric expressions.

### Notes

Cells that don't contain numbers are ignored.

Text entered directly in the arguments results in an error.

---

### Examples

MIN(5, 5, 5, 5, 6) returns 5.

---

MIN(1, 2, 3, 4, 5) returns 1.

---

## MINA

The MINA function finds the smallest number in a set of values. In addition to numeric values, text values and logical FALSE are counted as 0 and logical TRUE is counted as 1.

**MINA**(*value*, [*value*, . . .])

- *values*: A series of numbers or numeric expressions, or references to cells containing numbers, numeric expressions, text, or Boolean values. Text values are evaluated as 0.

### Notes

Text entered directly in the arguments results in an error.

---

### Examples

MINA(1, 2, 3, 4) returns 1.

---

MINA(A1:C1), where A1:C1 contains -1, -10, hello, returns -10.

---

MINA(A1:C1), where A1:C1 contains 1, 10, hello, returns 0.

---

## MINUTE

The MINUTE function extracts the minutes from a date or time.

**MINUTE**(*date-time*)

- *date-time*: Any valid Numbers date or time value.

---

### Examples

MINUTE("4/6/88 11:59:22 AM") returns 59.

---

## MIRR

The MIRR function calculates the modified internal rate of return of a series of periodic cash flows. MIRR stands for modified internal rate of return.

**MIRR**(*cash-flows*, *finance-rate*, *reinvest-rate*)

- *cash-flows*: One or more future cash flows. Values are ranges or arrays.
- *finance-rate*: The interest rate on *cash-flows*.
- *reinvest-rate*: The rate at which positive cash flows can be reinvested.

---

### Examples

MIRR({-5000, 2000, 4000, -2000, 5000}, 0.1, 0.15) returns 19.66% (when using the percent number format).

---

## MOD

The MOD function calculates the remainder upon division.

**MOD**(*number*, *divisor*)

- *number*: The dividend. It's a number, cell reference, or the result of an arithmetic operation.
- *divisor*: Any number but 0. The sign of the result matches that of the dividend, no matter what the sign of the divisor is.

### Notes

When both a positive and a negative remainder exist, MOD returns the remainder whose sign matches the sign of the divisor.

When computing MOD(*a*, *b*), MOD gives a number *r* such that  $a = bk + r$ , where *r* is between 0 and *b*, and *k* is an integer.

MOD(*a*,*b*) is equivalent to  $a - b * \text{INT}(a/b)$ .

---

### Examples

MOD(6, 3) returns 0.

---

MOD(7, 3) returns 1.

---

MOD(8, 3) returns 2.

---

MOD(-8, 3) returns 1.

---

MOD(4.5, 2) returns 0.5.

---

MOD(7, 0.75) returns 0.25.

---

## MODE

The MODE function finds the most frequently occurring value in a set of numbers.

**MODE**(*number*, [*number*, . . .])

- *number*: A set of numbers, numeric expressions, or references to cells containing numbers or numeric expressions.

### Notes

If more than one number occurs multiple times in the arguments, MODE returns the first qualifying number.

If no value occurs more than once, MODE reports an error.

---

### Examples

MODE(5, 5, 5, 5, 6) returns 5.

---

MODE(1, 2, 3, 4, 5) returns an error.

---

MODE(2, 2, 4, 6, 6) returns 2.

---

MODE(6, 6, 4, 2, 2) returns 6.

---

## MONTH

The MONTH function extracts the month number from a date.

**MONTH**(*date*)

- *date-time*: Any valid Numbers date.

---

### Examples

MONTH("April 6, 1988 11:59:22 AM") returns 4.

---

## MROUND

The MROUND function rounds a number to the nearest multiple of a specified factor.

**MROUND**(*number*, *factor*)

- *number*: The number you want to round. It can be a numeric expression, or a reference to a cell containing a numeric expression.
- *factor*: The number whose multiples you want to round to.

### Notes

Relative number size is based on magnitude (distance from 0).

Both arguments must have the same sign.

---

### Examples

MROUND(2, 3) returns 3.

MROUND(4, 3) returns 3.

MROUND(4.4999, 3) returns 3.

MROUND(4.5, 3) returns 6.

MROUND(-4.5, 3) returns an error.

---

## NOT

The NOT function evaluates the truth value of an expression and then returns the reverse. If the expression is true, the function returns FALSE; if the expression is false, the function returns TRUE.

**NOT**(*expression*)

- *expression*: A logical or numeric expression.

### Notes

If *expression* is a numeric expression, a value of 0 is interpreted as false and any nonzero value is interpreted as true.

---

### Examples

NOT(0) returns TRUE because 0 is interpreted as FALSE.

OR(A9, NOT(A9)) always returns TRUE because either A9 or its opposite will always be true.

NOT(OR(FALSE,FALSE)) mimics a logical NOR. In this case, it returns TRUE because neither argument of the logical OR is true.

---

## NOW

The NOW function gets the current date and time from the computer's clock. Time zones aren't taken into account.

### NOW()

- No arguments (but you must include the parentheses).

### Notes

The displayed date and time are updated every time you open or modify your document.

Whether you see the date, the time, or both depends on the cell formatting. See "Using the Date and Time Format" on page 62 for more information.

You can use the TODAY function to get the current date; the value returned is formatted to hide the time, which is always set to 12:00.

---

### Examples

If your document is updated on October 4, 2008, NOW() returns October 4, 2008 10:47 AM unless the cell holding the return value is otherwise formatted.

---

## NPER

The NPER function calculates the number of payment periods for a loan or investment based on fixed payments and a fixed interest rate.

### NPER(*rate*, *payment*, *present value*, [*future value*], [*when-due*])

- *rate*: The interest rate per period.
- *payment*: The payment to be made per period.
- *present-value*: The present value of the investment.
- *future-value*: Optional; the future value of the investment or cash value remaining after final payment. If omitted, *future value* is assumed to be 0.
- *when-due*: Optional; specifies whether payments are made at the beginning or end of each period:
  - 0 (or omitted) means payments are at the end of each period.
  - 1 means payments are at the beginning of each period.

### Notes

Be sure that the rate is expressed as the rate per period. For example, if the interest rate is 10% per year and the payment period is monthly, the rate used in the function should be 0.1/12 (approximately 0.00833 per month).

---

### Examples

NPER(0.1/12,-100,1000) returns 10.5 months, which you would round to 11, the time it takes to pay off a \$1,000 loan at an annual interest rate of 10% if you make monthly payments of \$100.

---

## NPV

The NPV function calculates the net present value of an investment based on a series of future cash flows, assuming a fixed interest rate.

**NPV**(rate, cash-flow, [cash-flow, . . .])

- *rate*: The fixed interest rate.
- *cash-flow*: One or more cash flows, such as payments (negative values) or income (positive values). Specify the values in chronological order. Ranges can be used for values.

---

### Examples

NPV(10%,-5000,0,10000,10000,10000) returns \$16007.04 (when using the currency number format). The return value indicates that the net present value of a \$5,000 investment at 10% interest, followed by an income flow of \$0, \$10,000, \$10,000, and \$10,000, is \$16,007.04 after four years.

---

## ODD

The ODD function rounds a number away from zero to the next odd number.

**ODD**(number)

- *number*: The number you want to round. It can be a number, numeric expression, or a reference to a cell containing a numeric expression.

### Notes

To round to an even number, use the EVEN function.

---

### Examples

ODD(1) returns 1.

---

ODD(2) returns 3.

---

ODD(2.5) returns 3.

---

ODD(-2.5) returns -3.

---

ODD(0) returns 1.

---

## OFFSET

The OFFSET function retrieves a range of cells that is the specified number of rows and columns away from the specified base cell.

**OFFSET**(*base*, *row-offset*, *column-offset*, [*rows*], [*columns*])

- *base*: The address of the cell from which the offsets are measured.
- *row-offset*: The number of rows from the base cell to the target cell. 0 means the target cell is in the same row as the base cell. A negative number means the target is to the left of the base.
- *column-offset*: The number of columns from the base cell to the target cell. 0 means the target is in the same column as the base cell. A negative number means the target is above the base.
- *rows*: Optional; the number of rows to retrieve starting with the offset location. If omitted, 1 is used.
- *columns*: Optional; the number of columns to retrieve starting with the offset location. If omitted, 1 is used.

---

### Examples

OFFSET(A1,5,5) returns the value in cell F6 (the cell 5 columns to the right and 5 rows below cell A1).

OFFSET(G33,0,-1) returns the value in the cell to the left of G33 (the value in F33).

---

## OR

The OR function returns TRUE if any argument is true and FALSE otherwise.

**OR**(*expression*, [*expression*, ...])

- *expression*: One or more logical or numeric expressions.

### Notes

If *expression* is a numeric expression, a value of 0 is interpreted as FALSE and any nonzero value is interpreted as TRUE.

---

### Examples

OR(A1+A2<100,B1+B2<100) returns false if the sums of the indicated cells are both greater than or equal to 100, and true if at least one of the sums is less than 100.

OR(5,0,6) returns true because at least one argument is not zero.

---

## PERCENTILE

The PERCENTILE function finds the value within a range of values that corresponds to a particular percentile.

**PERCENTILE**(*data*, *percentile*)

- *data*: A range of cells containing the data.
- *percentile*: The percentile value you want to find.

---

### Examples

Given the following table:

	A	B	C	D	E	F
1						
2	70	75	80	85	90	
3						
4	70	90	90	90	90	
5						
6						

---

PERCENTILE(A2:E2, 0.5) returns 80, the 50th percentile of the range.

---

PERCENTILE(A4:E4, 0.5) returns 90, the 50th percentile of the range.

---

## PI

The PI function returns the approximate value of pi, the ratio of a circle's circumference to its diameter, accurate to 15 decimal places.

**PI**()

- No arguments (but you must include the parentheses).

---

### Examples

PI() returns 3.14159265358979.

---

SIN(PI()/2) returns 1, the sine of PI/2 radians or 90 degrees.

---

## PMT

The PMT function calculates fixed, periodic payments, given the interest rate, number of periods, present value, future value, and type of payment.

**PMT**(*rate*, *num-periods*, *present-value*, [*future-value*], [*when-due*])

- *rate*: The interest rate per period.
- *num-periods*: The number of periods.
- *present-value*: The present value of the investment.
- *future-value*: Optional; the future value of the investment or cash value remaining after final payment. If omitted, *future-value* is assumed to be 0.
- *when-due*: Optional; specifies whether payments are made at the beginning or end of each period:
  - 0 (or omitted) means payments are at the end of each period.
  - 1 means payments are at the beginning of each period.

### Notes

To break down a payment into principal and interest components, you can use the PPMT and IPMT functions.

---

#### Examples

**PMT**(10%/12,36,10000,0) returns -\$322.67. The return value indicates that a \$12,000 purchase minus a \$2,000 down payment (or \$10,000) over 36 months at a 10% interest rate requires monthly payments of \$322.67.

---

## POISSON

The POISSON function uses the Poisson distribution to calculate the probability that a specific number of events will occur.

**POISSON**(*events*, *mean*, *cumulative*)

- *events*: The number of events (arrivals) for which you want to calculate the probability.
- *mean*: The known average rate of events.
- *cumulative*: Determines whether the reported probability is cumulative:
  - TRUE calculates the probability that there will be the specified number of arrivals or fewer (also called the cumulative probability).
  - FALSE calculates the probability that there will be the specified number of arrivals (sometimes called the probability mass).

---

### Examples

For a mean of 10 and an arrival rate of 8:

POISSON(8, 10, FALSE) returns 0.112599.

---

## POWER

The POWER function raises a number, the base, to a power, the exponent. Produces the same result as the  $\wedge$  operator.

**POWER**(*base*, *exponent*)

- *base*: The number that you want to raise to a power.
- *exponent*: The power to which you want to raise the base number.

### Notes

You can also use the exponentiation operator  $\wedge$  to raise a number to a power: POWER(2, 3) has the same result as  $2^3$ .

---

### Examples

POWER(2, 3) returns 8.

POWER(2, 10) returns 1024.

POWER(0.5, 3) returns 0.125.

POWER(100, 0.5) returns 10.

---

## PPMT

The PPMT function calculates the principal portion of a payment for a loan or investment at a specified period based on periodic fixed payments and a fixed interest rate.

**PPMT**(*rate*, *period*, *num-periods*, *present-value*, [*future-value*], [*when-due*])

- *rate*: The interest rate for each period.
- *period*: The period for which you want to find the principal.
- *num-periods*: The number of periods in the life of the investment.
- *present-value*: The present value of the loan or investment.
- *future-value*: Optional; the target future value, if this in an investment. If omitted, assumed to be 0.
- *when-due*: Optional; specifies whether payments are made at the beginning or end of each period:
  - 0 (or omitted) means payments are at the end of each period.
  - 1 means payments are at the beginning of each period.

## Notes

Be sure that the interest rate is expressed as the rate per period. For example, if the interest rate is 10% per year and the payment period is monthly, the rate used in the function should be 0.1/12 (approximately 0.00833 per month).

---

### Examples

To find the principal portion of the first payment on a \$1000 loan at 12% annual interest with payments due at the end of each month:

PPMT(0.12/12, 1, 12, 1000) returns -\$78.85.

---

## PRICE

The PRICE function calculates the price of a security that pays periodic interest per \$100 par value.

**PRICE**(*settle*, *maturity*, *rate*, *yield*, *value*, *frequency*, [*day-count*])

- *settle*: The settlement date.
- *maturity*: The date when the security expires.
- *rate*: The annual coupon rate.
- *yield*: The annual yield of the security.
- *value*: The redemption value on the maturity date. Expressed per \$100 par value.
- *frequency*: The number of coupon payments each year.
  - 1 means annual payments.
  - 2 means semiannual payments (twice per year).
  - 4 means quarterly payments (four per year).
- *day-count*: Optional; specifies the number of days per month and days per year used in the calculations (sometimes called the day count basis).
  - 0 or omitted uses 30/360 (30 days for each month, 360 days in a year).
  - 1 uses actual/actual (the number of days shown on a calendar).
  - 2 uses actual/360 (calendar days for each month but 360 days per year).
  - 3 uses actual/365 (calendar days for each month but 365 days per year).
  - 4 uses 30E/360 (European 30/360).

---

### Examples

If cells A1:F1 contain 1/1/2000, 1/1/2001, 0.05, 0.1, 100, 2:

PRICE(A1, A2, A3, A4, A5, A6) returns 95.35157.

---

## PRICEDISC

The PRICEDISC function calculates the price of a discounted security per \$100 par value.

**PRICEDISC**(*settle, maturity, discount, value, [day-count]*)

- *settle*: The settlement date.
- *maturity*: The date when the security expires.
- *discount*: The discount rate.
- *value*: The redemption value on the maturity date. Expressed per \$100 par value.
- *day-count*: Optional; specifies the number of days per month and days per year used in the calculations (sometimes called the day count basis).
  - 0 or omitted uses 30/360 (30 days for each month, 360 days in a year).
  - 1 uses actual/actual (the number of days shown on a calendar).
  - 2 uses actual/360 (calendar days for each month but 360 days per year).
  - 3 uses actual/365 (calendar days for each month but 365 days per year).
  - 4 uses 30E/360 (European 30/360).

---

### Examples

If cells A1:D1 contain 1/1/2000, 1/1/2001, 0.1, 100:

PRICEDISC(A1, B1, C1, D1) returns 90.

---

## PRICEMAT

The PRICEMAT function calculates the price of a security that pays interest at maturity per \$100 par value.

**PRICEMAT**(*settle, maturity, issue, rate, yield, [day-count]*)

- *settle*: The settlement date.
- *maturity*: The date when the security expires.
- *issue*: The issue date of the security.
- *rate*: The redemption value on the maturity date. Expressed per \$100 par value.
- *yield*: The annual yield.
- *day-count*: Optional; specifies the number of days per month and days per year used in the calculations (sometimes called the day count basis).
  - 0 or omitted uses 30/360 (30 days for each month, 360 days in a year).
  - 1 uses actual/actual (the number of days shown on a calendar).
  - 2 uses actual/360 (calendar days for each month but 360 days per year).
  - 3 uses actual/365 (calendar days for each month but 365 days per year).
  - 4 uses 30E/360 (European 30/360).

---

## Examples

If cells A1:E1 contain 1/1/2000, 1/1/2010, 1/1/1999, 0.1, 0.1:

PRICEMAT(A1, B1, C1, D1, E1) returns 95.

---

## PROB

The PROB function calculates the probability of a range of values if you know the probabilities of the individual values.

**PROB(values, probabilities, lower, [upper])**

- *values*: A range of cells containing data values.
- *probabilities*: A range of cells containing the probability of each corresponding value in *values*. The sum of the probabilities must add up to 1.
- *lower*: The lower limit of the range for which you want to find the probability.
- *upper*: Optional; the upper limit of the range for which you want to find the probability. If omitted, PROB finds the probability of the single number specified for *lower*.

---

## Examples

Given the following table:

	A	B	C	D	E	F
1	1		0.1		0.02	
2	2		0.1		0.03	
3	3		0.1		0.04	
4	4		0.1		0.15	
5	5		0.1		0.23	
6	6		0.1		0.21	
7	7		0.1		0.18	
8	8		0.1		0.09	
9	9		0.1		0.04	
10	0		0.1		0.01	
11						

---

PROB(A1:A10, C1:C10, 4, 6) returns 0.3, the probability that the value is 4, 5, or 6.

---

PROB(A1:A10, C1:C10, 5, 9) returns 0.5, the probability that the value is 5 or greater.

---

PROB(A1:A10, E1:E10, 4, 6) returns 0.59, the probability that the value is 4, 5, or 6.

---

PROB(A1:A10, E1:E10, 6) returns 0.21, the probability that the value is 6.

---

## PRODUCT

The PRODUCT function calculates the product of the numbers in the arguments.

**PRODUCT**(*number*, [*number*, . . .])

- *number*: One or more numbers or numeric expressions, or references to cells containing numbers or numeric expressions.

### Notes

Empty cells in a range are ignored and do not affect the result.

---

#### Examples

PRODUCT(2, 4) returns 8.

PRODUCT(0.5, 5, 4, 5) returns 50.

---

## PROPER

The PROPER function changes the first character in each word of text to uppercase. All other characters are changed to lowercase.

**PROPER**(*text*)

- *text*: A text expression.

### Notes

Any character following a nonalphabetic character is treated as the first letter in a word. So, for example, any letter following a hyphen is capitalized.

---

#### Examples

PROPER("lorem ipsum") returns "Lorem Ipsum".

PROPER("lorem's ip-sum") returns "Lorem's Ip-Sum".

PROPER("1a23 b456") returns "1A23 B456".

---

## PV

The PV function calculates the present value of an investment, which is the current value of a series of future payments, based on a specific periodic interest rate over a given number of periods for a given payment amount. PV stands for present value.

**PV**(*rate*, *num-periods*, [*payment*], [*future-value*], [*when-due*])

- *rate*: The interest rate per period.
- *num-periods*: The number of periods.
- *payment*: Optional; the payment to be made per period. If omitted, you must include *future-value*.

- *future-value*: Optional; the future value of the investment or cash value remaining after final payment. If omitted, *future value* is assumed to be 0 and you must include *payment*.
- *when-due*: Optional; specifies whether payments are made at the beginning or end of each period:
  - 0 (or omitted) means payments are at the end of each period.
  - 1 means payments are at the beginning of each period.

---

### Examples

PV(10%,5,-100,5000) returns -\$2725.53, unless the cell holding the return value has been formatted. The return value indicates that to accumulate \$5,000 in five years, when making payments of \$100 at the end of each year, you would have to invest \$2,725.53 now, at an interest rate of 10%.

---

## QUOTIENT

The QUOTIENT function finds the integer quotient of two numbers, that is, the whole part of the quotient with the fractional part (or remainder) truncated.

**QUOTIENT**(*dividend*, *divisor*)

- *dividend*: The number you want to divide.
- *divisor*: The number you want to divide by.

---

### Examples

QUOTIENT(5, 2) returns 2.

QUOTIENT(-5, 2) returns -2.

QUOTIENT(5.99, 2) returns 2.

QUOTIENT(6, 2) returns 3.

QUOTIENT(5, 6) returns 0.

---

## RADIANS

The RADIANS function converts degrees to radians, the standard angle measure used for trigonometric functions.

**RADIANS**(*degrees*)

- *degrees*: A numeric expression.

---

### Examples

RADIANS(90) returns 1.5708 (90 degrees is approximately 1.5708 radians).

RADIANS(57.2957795130823) returns 1 (1 radian is approximately 57.296 degrees).

---

## RAND

The RAND function generates a random number greater than or equal to 0 and less than 1.

RAND()

- No arguments (but you must include the parentheses).

### Notes

Any time you change a value in the table, a new random number is generated.

---

#### Examples

RAND() returns, for example, 0.67, 0.12, 0.8, and 0.9 after 4 recalculations.

---

## RANDBETWEEN

The RANDBETWEEN function generates a random integer in the range of the specified minimum and maximum.

RANDBETWEEN(*min*, *max*)

- *min*: The smallest number.
- *max*: The largest number.

### Notes

Any time you change a value in the table, a new random number is generated.

---

#### Examples

RANDBETWEEN(1, 10) returns, for example, 7, 2, 9, 3, and 9 during subsequent recalculations.

---

## RANK

The RANK function finds the rank of a number within a range of numbers. You can choose to rank the numbers from largest down, or smallest up.

RANK(*number*, *range*, [*order*])

- *number*: The number whose rank you want to find.
- *range*: A reference to the range within which you want to rank *number*.
- *order*: Optional: specifies whether the smallest or the largest value in the range is ranked 1.

0 (or omitted) ranks the number as if the largest value in the array has ranking 1.

Any other number ranks the number as if the smallest value in the array as ranking 1.

## Notes

Equal numbers are ranked the same, but each counts as a rank position, so the next different number doesn't get the next rank position. (Just like in sports competitions, if there's a tie for first place, the next competitor gets third place, not second.) See the examples.

---

## Examples

Given the following table:

	A	B	C	D	E	F
1						
2	10	20	30	40	50	
3						
4	30	20	50	10	40	
5						
6	1	2	3	4	4	
7	5	6	7	8	9	
8						

---

RANK(20, A2:E8) returns 7.

---

RANK(20, A2:E2) returns 4 (50 ranks first).

---

RANK(20, A2:E2, 1) returns 2 (10 ranks first).

---

RANK(10, A4:E4) returns 5 (10 is the smallest in the range).

---

RANK(4, A6:E7, 1) returns 4.

---

RANK(5, A6:E7, 1) returns 6 (because there are two 4's).

---

## RATE

The RATE function calculates the interest rate of an annuity (a fixed sum paid periodically over a specified period of time). If either *present-value* or *num-periods* is 0, the function returns an error.

**RATE**(*num-periods*, [*payment*], *present-value*, [*future-value*], [*when-due*], [*estimate*])

- *num-periods*: The number of payment periods.
- *payment*: Optional; the amount of the fixed, periodic payment. If omitted, you must include *future-value*.
- *present-value*: The present value of the investment.
- *future-value*: Optional; the future value of the investment. If omitted, is assumed to be 0.
- *when-due*: Optional; specifies whether payments are made at the beginning or end of each period:
  - 0 (or omitted) means payments are at the end of each period.
  - 1 means payments are at the beginning of each period.

- *estimate*: Optional; an initial rough estimate of the interest rate. If omitted, 10% is used. Try adjusting the estimate if RATE fails to return a result.

---

### Examples

RATE(10\*12,-5000,20000) returns 1.16% (when using a fixed number format with a precision of 4). The return value indicates that a monthly interest rate of 1.16% (or 13.9% annually) is required for \$5,000 to grow to \$20,000 in 10 years. The number of years is multiplied by 12 to find the number of monthly payments.

---

## REPLACE

The REPLACE function replaces part of a string with characters from a second string. The text to be replaced is specified by its length and position in the text.

**REPLACE**(*current-text*, *start*, *length*, *new-text*)

- *current-text*: A text expression.
- *start*: A number indicating the first character to replace.
- *length*: The number of characters to replace.
- *new-text*: The replacement text.

### Notes

The new text doesn't need to be the same length as the removed text.

---

### Examples

REPLACE("received applicant's forms",10,9,"Frank") returns "received Frank's forms".

---

## REPT

The REPT function repeats text a specified number of times.

**REPT**(*text*, *copies*)

- *text*: The text expression to be repeated.
  - *copies*: The number of times *text* is repeated.
- 

### Examples

REPT("\*",5) returns "\*\*\*\*\*".

REPT("ha",3) returns "hahaha".

---

## RIGHT

The RIGHT function retrieves the specified number of characters from the right end of a string.

**RIGHT**(*text*, [*length*])

- *text*: A text expression.
- *length*: Optional; the number of characters you want to retrieve. If omitted, returns 1 character.

---

### Examples

RIGHT("one two three", 2) returns "ee".

RIGHT("abc") returns "c".

---

## ROMAN

The ROMAN function converts a number to Roman numerals.

**ROMAN**(*number*, [*style*])

- *number*: The Arabic numeral that you want to convert. Must be nonnegative and less than 4000.
- *style*: Optional; determines how strictly the classical rules for forming Roman numerals are applied:

0 (or TRUE, or omitted) uses the most strict classical rules. When a smaller numeral precedes a larger to indicate subtraction, the smaller must be a power of 10 and can precede a number no more than 10 times its size. For example, 999 is represented as CMXCIX, but not LMVLIV.

1 relaxes the strict classical rule by one degree. When a smaller number precedes a larger, the smaller need not be a power of 10 and the relative size rule is extended by one numeral. For example, 999 can be represented as LMVLIV, but not XMIX.

2 relaxes the classical rule by two degrees. When a smaller number precedes a larger, the relative size rule is extended by two numerals. For example, 999 can be represented as XMIX, but not VMIV.

3 relaxes the classical rule by three degrees. When a smaller number precedes a larger, the relative size rule is extended by two numerals. For example, 999 can be represented as VMIV, but not IM.

4 or FALSE relaxes the classical rule by four degrees. When a smaller number precedes a larger, the relative size rule is extended by two numerals. For example, 999 can be represented as IM.

---

### Examples

ROMAN(12) returns XII.

---

ROMAN(999) returns CMXCIX.

---

ROMAN(999,1) returns LMLIV.

---

ROMAN(999,2) returns XMIX.

---

ROMAN(999,3) returns VMIV.

---

ROMAN(999,4) returns IM.

---

## ROUND

The ROUND function rounds a number to the specified number of places.

### ROUND(*number*, *digits*)

- *number*: The number you want to round. It can be a numeric expression in the function or a reference to a cell containing a numeric expression.
- *digits*: The number of digits you want to round to, relative to the decimal point. A positive number represents digits (decimal places) to the right of the decimal point. A negative number specifies digits to the left of the decimal point.

### Notes

Other functions related to rounding numbers: CEILING, INT, ROUNDUP, ROUNDDOWN, TRUNC.

---

### Examples

ROUND(1.49,0) returns 1.

---

ROUND(1.50,0) returns 2.

---

ROUND(1.23456,3) returns 1.235.

---

ROUND(1111.222,-2) returns 1100.

---

ROUND(-2.2,0) returns -2.

---

ROUND(-2.8,0) returns -3.

---

## ROUNDDOWN

The ROUNDDOWN function rounds a number toward zero to the specified number of places.

### ROUNDDOWN(*number*, *digits*)

- *number*: The number you want to round. It can be a numeric expression in the function or a reference to a cell containing a numeric expression.
- *digits*: The number of digits of the result relative to the decimal point. A positive number represents digits (decimal places) to the right of the decimal point. A negative number specifies digits to the left of the decimal point.

## Notes

Other functions related to rounding numbers: CEILING, INT, ROUND, ROUNDUP, TRUNC.

---

### Examples

ROUNDDOWN(1.49,0) returns 1.

ROUNDDOWN(1.50,0) returns 1.

ROUNDDOWN(1.23456,3) returns 1.234.

ROUNDDOWN(1111.222,-2) returns 1100.

ROUNDDOWN(-2.2,0) returns -2.

ROUNDDOWN(-2.8,0) returns -2.

---

## ROUNDUP

The ROUNDUP function rounds a number away from zero to the specified number of places.

### ROUNDUP(*number, digits*)

- *number*: The number you want to round. It can be a number, numeric expression, or a reference to a cell containing a numeric expression.
- *digits*: The number of digits of the result relative to the decimal point. A positive number represents digits (decimal places) to the right of the decimal point. A negative number specifies digits to the left of the decimal point.

## Notes

Other functions related to rounding numbers: CEILING, INT, ROUND, ROUNDDOWN, TRUNC.

---

### Examples

ROUNDUP(1.49,0) returns 2.

ROUNDUP(1.50,0) returns 2.

ROUNDUP(1.23456,3) returns 1.235.

ROUNDUP(1111.222,-2) returns 1200.

ROUNDUP(-2.2,0) returns -3.

ROUNDUP(-2.8,0) returns -3.

---

## ROW

The ROW function returns the row number of the specified cell.

**ROW**([*cell*])

- *cell*: Optional; a reference to a single cell. If not provided, ROW returns the row of the cell containing the function.

---

### Examples

ROW(B7) returns 7, the number of row 7.

ROW() returns the absolute row number of the cell containing the function.

---

## ROWS

The ROWS function counts how many rows are in the specified range of cells.

**ROWS**(*cell-range*)

- *cell-range*: A reference to a range of cells.

### Notes

If you select an entire column for *cell-range*, ROWS returns the total number of cells in the column, which changes when you resize the table.

---

### Examples

ROWS(A11:D20) returns 10, the number of rows from 11 through 20.

ROWS(D:D) returns the total number of rows in column D.

---

## SEARCH

The SEARCH function finds the starting position of one string within another, ignoring case but allowing wildcards.

**SEARCH**(*search-text*, *where-to-look*, [*start*])

- *search-text*: The string you want to find. You can include an asterisk (\*) to match any number of characters or a question mark (?) to match any single character.
- *where-to-look*: The text in which you want to look for the string.
- *start*: Optional; a number indicating the position in the text where you want to start the search. If omitted, the search starts at the beginning of the text.

---

### Examples

SEARCH("ra", "abracadabra") returns 3; the first occurrence of the string "ra" starts at the third character in "abracadabra".

SEARCH("ra", "abracadabra", 5) returns 10, the position of the first occurrence of string "ra" when you start looking at position 5.

---

## SECOND

The SECOND function extracts the seconds from a date.

**SECOND**(*datetime*)

- *date-time*: Any valid Numbers date or time value.

---

### Examples

SECOND("4/6/88 11:59:22 AM") returns 22.

---

## SIGN

The SIGN function returns 1 when the argument number is positive, -1 when it is negative, and 0 when it is zero.

**SIGN**(*number*)

- *number*: The number you want to find the sign of. It can be a reference to a cell containing a number.

---

### Examples

SIGN(2) returns 1.

SIGN(0) returns 0.

SIGN(-2) returns -1.

SIGN(A4) returns -1 if cell A4 contains -2.

---

## SIN

The SIN function calculates the sine of an angle in radians.

**SIN**(*radian-angle*)

- *radian-angle*: The angle in radians.

### Notes

If you measure angles in degrees instead of radians, you can use the RADIANS function to convert degrees to radians for the SIN function.

If you want to express radians as a multiple of pi, you can use the PI() function to provide a value for pi.

---

### Examples

SIN(1) returns 0.841470985, the sine of 1 radian (approximately 57.3 degrees).

---

SIN(RADIANS(30)) returns 0.5, the sine of 30 degrees.

---

SIN(PI()/2) returns 1, the sine of PI/2 radians (90 degrees).

---

## SINH

The SINH function calculates the hyperbolic sine of the specified number.

**SINH**(*number*)

- *number*: Any number.

---

### Examples

SINH(0) returns 0.

---

SINH(1) returns 1.175.

---

SINH(5) returns 74.203.

---

SINH(10) returns 11013.233.

---

## SLN

The SLN function calculates the straight-line depreciation of an asset during a period.

**SLN**(*cost, salvage, life*)

- *cost*: The original cost or value of the asset.
- *salvage*: The salvage value of the asset.
- *life*: The number of periods over which the depreciation is spread.

---

### Examples

SLN(10000, 1000, 6) returns \$1500, the depreciation per year, in dollars, of an asset that originally costs \$10,000 but is worth only \$1,000 after 6 years.

---

## SLOPE

The SLOPE function calculates the slope of the best-fit line for the data set based on linear regression analysis.

**SLOPE**(*y-range*, *x-range*)

- *y-range*: A range of cells containing the dependent variable *y*. Must be the same size as *x-range*.
- *x-range*: A range of cells containing the independent variable *x*. Must be the same size as *y-range*.

### Notes

To find the y-intercept of the best-fit line, use the INTERCEPT function.

---

### Examples

Given the following table:

	A	B	C	D	E	F
1	1	2	3	4	5	6
2	3	5	7	9	11	13
3						
4	2.1	3.3	4.5	5.5	6.4	7.2
5	3.4	3.7	4	4.4	5.1	5.4
6						
7						

---

SLOPE(A2:F2, A1:F1) returns 2.

---

INTERCEPT(A2:F2, A1:F1) returns 1.

---

SLOPE(A5:F5, A4:F4) returns 0.402.

---

## SMALL

The SMALL function retrieves the *n*th-smallest value in a range. The smallest value is ranked number 1.

**SMALL**(*range*, *rank*)

- *range*: The array of cells containing the values.
- *rank*: A number representing the rank of the value you want to return (smallest is ranked 1, second-smallest is ranked 2, and so on).

### Notes

If rank is omitted, is less than or equal to 0, or is greater than the number of values in the array, an error is returned.

---

## Examples

Given the following table:

	A	B	C	D	E	F
1						
2	30	20	50	10	40	
3						

---

SMALL(A2:E2, 1) returns 10, the smallest value in the array.

---

SMALL(A2:E2, 2) returns 20, the third-smallest value in the array.

---

SMALL(A2:E2, 5) returns 50, the longest value in the array.

---

SMALL(A1:A5, 0) displays an error; rank must be greater than 0.

---

SMALL(A1:A5, 6) displays an error; you can't find the sixth out of five values.

---

## SQRT

The SQRT function calculates the square root of a number.

**SQRT**(*number*)

- *number*: A nonnegative numeric expression.

---

## Examples

SQRT(16) returns 4.

---

SQRT(12.25) returns 3.5, the square root of 12.25.

---

## STDEV

The STDEV function calculates the standard deviation of a set of values based on their sample (unbiased) variance. This is appropriate when the specified values represent only a sample of a larger population.

**STDEV**(*number*, [*number*, ...])

- *number*: One or more numbers or cell references.

## Notes

The standard deviation is the square root of the variance returned by the VAR function.

If the values you are analyzing represent the entire data set or population, you might want to use the STDEVP function instead.

Cells that don't contain numbers are ignored. If you want to include text or Boolean values in the computation, use the STDEVA function.

---

### Examples

STDEV(5, 5, 5, 5, 6) returns a standard deviation of 0.447 based on an average of 5.2.

---

STDEV(1, 2, 3, 4, 5) returns a standard deviation of 1.58 based on an average of 3.

---

STDEV(1, 1, 1, 1, 6) returns a standard deviation of 2.24 based on an average of 2.

---

STDEV(2, 2, 4, 6, 6) returns a standard deviation of 2 based on an average of 4. Compare with STDEV(2, 2, 4, 6, 6), which uses the population (true) variance to return a standard deviation of 1.79.

---

## STDEVA

The STDEVA function calculates the standard deviation of a set of values, including text and Boolean values, based on the sample (unbiased) variance.

**STDEVA**(*value*, [*value*, ...])

- *value*: One or more numeric or Boolean values or references to cells containing numeric, textual, or Boolean values.

### Notes

Unlike the STDEV function, which ignores cells that don't contain numbers, STDEVA assigns a value of 0 to any text value, 0 to the Boolean value FALSE, and 1 to the Boolean value TRUE and includes them in the computation.

Entering text directly results in an error. Referencing a cell containing text is evaluated as 0. Boolean values can be entered directly or as cell references.

For a data set containing only numbers, STDEVA returns the same result as STDEV.

---

### Examples

STDEVA(TRUE, TRUE, TRUE, TRUE, 6) returns 2.24. Each TRUE value is counted as a 1.

---

STDEVA("a", 3, 6, 3, "b") displays an error.

---

## STDEVP

The STDEVP function calculates the standard deviation of a set of values based on their population (true) variance. This is appropriate when the specified values are the entire population.

**STDEVP**(*number*, [*number*, ...])

- *number*: A series of numbers or cell references.

### Notes

The standard deviation is the square root of the variance returned by the VARP function.

If the values you are analyzing are only a sample of a larger population, you might want to use the STDEV function instead.

Cells that don't contain numbers are ignored. If you want to include text or Boolean values in the computation, use the STDEVPA function.

---

### Examples

STDEVP(5, 5, 5, 5, 6) returns a standard deviation of 0.4 based on an average of 5.2.

---

STDEVP(1, 2, 3, 4, 5) returns a standard deviation of 1.41 based on an average of 3.

---

STDEVP(1, 1, 1, 1, 6) returns a standard deviation of 2 based on an average of 2.

---

STDEVP(2, 2, 4, 6, 6) returns a standard deviation of 1.79 based on an average of 4. Compare with STDEV(2, 2, 4, 6, 6), which uses the sample (unbiased) variance to return a standard deviation of 2.

---

## STDEVPA

The STDEVPA function calculates the standard deviation of a set of values, including text and Boolean values, based on the population (true) variance.

**STDEVPA**(*value*, [*value*, ...])

- *value*: One or more numeric or Boolean values or references to cells containing numeric, textual, or Boolean values.

### Notes

Unlike the STDEVP function, which ignores cells that don't contain numbers, STDEVPA assigns a value of 0 to any text value, 0 to the Boolean value FALSE, and 1 to the Boolean value TRUE and includes them in the computation.

Entering text directly results in an error. Referencing a cell containing text is evaluated as 0. Boolean values can be entered directly or as cell references.

If the values you are analyzing are only a sample of a larger population, you might want to use the STDEVA function instead.

---

### Examples

STDEVPA(TRUE, TRUE, TRUE, TRUE, 6) returns 2. Each TRUE value is counted as a 1.

---

STDEVPA("a", 3, 6, 3, "b") displays an error.

---

## SUBSTITUTE

The SUBSTITUTE function replaces a string of characters with new text. You can replace individual characters, whole words, or strings of characters within words. If a string occurs more than once in the text, you can specify which occurrences to change.

**SUBSTITUTE**(*text*, *old*, *new*, [*occurrence*])

- *text*: The text within which you want to replace characters.
- *old*: The string of characters you want to replace.
- *new*: The string of characters that will replace the old string.
- *occurrence*: Optional; specifies which occurrence of the old string is replaced if there is more than one. If omitted, all occurrences of the string are replaced.

---

### Examples

SUBSTITUTE("a b c d e f", "b", "B") returns "a B c d e f".

SUBSTITUTE("a a b b b c", "a", "A", 2) returns "a A b b b c".

SUBSTITUTE("a a b b b c", "b", "B") returns "a a B B B c".

SUBSTITUTE("aaabbccc", "bc", "BC", 2) returns "aaabbccc".

---

## SUM

The SUM function calculates the sum of a set of numbers. The numbers can be in individual cells, in ranges of cells, or included directly as arguments to the function.

**SUM**(*number*, [*number*, . . .])

- *number*: One or more numbers, numeric expressions, or references to a cell or range of cells containing numbers or numeric expressions.

---

### Examples

SUM(A1:A4) adds the numbers in four cells.

SUM(A1:D4) adds the numbers in a square array of sixteen cells.

SUM(A1:A4, 100) adds the numbers in four cells plus 100.

---

## SUMIF

The SUMIF function calculates the sum of a set of numbers, but includes only numbers that satisfy a specified condition. The condition that determines whether each number is included can be performed on the number itself or on a corresponding value in a second range of values.

**SUMIF**(*test-range*, "*condition*", [*sum-range*])

- *test-range*: A reference to the range of cells containing values to test. Must be the same dimensions as *sum-range*.
- "*condition*": Any comparison statement that results in a logical TRUE or FALSE value.
- *sum-range*: Optional; a reference to the range of cells containing the numbers to be added. Must have the same dimensions as *test-range*. If omitted, *test-range* is used.

### Notes

For more information on the comparison operators you can use in the conditional test, see "Understanding the Comparison Operators" on page 96.

---

### Examples

Given the following table:

	A	B	C	D	E	F
1	1	10		a	b	c
2	2	20		b	c	b
3	3	30		a	a	c
4	4	40				
5	5	50		1	5	9
6	6	60		5	9	5
7	7	70		1	1	9
8	8	80				
9						

---

SUMIF(A1:A8, "<5") returns 10.

---

SUMIF(A1:A8, "<5", B1:B8) returns 100.

---

SUMIF(D1:F3, "=c", D5:F7) returns 27.

---

SUMIF(B1:D1, 1) or SUMIF(B1:D1, SUM(1)) both total all the occurrences of 1 in the range.

---

## SUMPRODUCT

The SUMPRODUCT function calculates the sum of the products of corresponding numbers in two or more ranges of numbers. The ranges must have the same dimensions.

**SUMPRODUCT**(*range*, *range*, [*range*, . . .])

- *range*: A reference to a range of cells containing numbers or numeric expressions.

## Notes

If any cell in any of the ranges contains a nonnumeric value, values in corresponding cells are not included in the calculation.

---

### Examples

SUMPRODUCT(3,4) returns 12.

SUMPRODUCT({1, 2}, {3, 4}) = 3 + 8 = 11.

---

## SUMSQ

The SUMSQ function calculates the sum of the squares of a set of numbers. The numbers can be in individual cells, in ranges of cells, or included directly as arguments to the function.

**SUMSQ**(*number*, [*number*, ...])

- *number*: A number, a numeric expression, or a reference to a cell or range of cells containing numbers or numeric expressions.

---

### Examples

SUMSQ(3,4) returns 25.

SUMSQ(A1:A4) adds the squares of the list of four numbers.

SUMSQ(A1:D4) adds the squares of the 16 numbers in a square array of cells.

SUMSQ(A1:A4, 10) adds the squares of the numbers in four cells plus 100.

SQRT(SUMSQ(3,4)) returns 5, using the Pythagorean theorem to find the length of the hypotenuse of a triangle with sides 3 and 4.

---

## SYD

The SYD function calculates the sum-of-years'-digits depreciation of an asset during a particular period.

**SYD**(*cost*, *salvage*, *life*, *period*)

- *cost*: The initial cost of the asset.
- *salvage*: The salvage value of the asset.
- *life*: The number of periods over which the asset is depreciating.
- *period*: The period for which you want to calculate the depreciation allowance.

---

### Examples

SYD(10000, 1000, 9, 1) returns \$1,800, the depreciation value of a \$10,000 asset after 1 year if the asset's salvage value is \$1,000 after a 9-year life.

---

## T

The T function retrieves text from a cell. If the cell doesn't contain a string, T returns an empty string.

$T(\text{cell})$

- *cell*: A reference to the cell from which you want to retrieve text.

### Notes

This function is included so you can use spreadsheets created with older spreadsheet applications that might use it.

---

### Examples

If cell A1 contains "text" and cell B1 is empty:

$T(A1)$  returns "text" and  $T(B1)$  returns nothing.

---

## TAN

The TAN function calculates the tangent of an angle, the ratio of the sine to the cosine.

$TAN(\text{radian-angle})$

- *radian-angle*: An angle in radians.

### Notes

If you measure angles in degrees instead of radians, you can use the RADIANS function to convert degrees to radians for the TAN function.

If you want to express radians as a multiple of pi, you can use the PI() function to provide a value for pi.

---

### Examples

$TAN(1)$  returns 1.557407725, the tangent of 1 radian (approximately 57.3 degrees).

$TAN(RADIANS(45))$  returns 1, the tangent of a 45-degree angle.

$TAN(3*PI()/4)$  returns -1.

---

## TANH

The TANH function returns the hyperbolic tangent of the specified number.

**TANH**(*number*)

- *number*: Any number.

---

### Examples

TANH(0) returns 0.

---

TANH(1) returns 0.762.

---

TANH(5) returns 0.999909.

---

TANH(10) returns 0.999999996.

---

## TIME

The TIME function converts hours, minutes, and seconds into a time format.

**TIME**(*hours, minutes, seconds*)

- *hours*: The number of hours (using a 24-hour clock).
- *minutes*: The number of minutes.
- *seconds*: The number of seconds.

### Notes

You can specify hour, minute, and second values greater than 23, 59, and 59, respectively. If the hours, minutes, and seconds add up to more than 24 hours, Numbers subtracts 24 hours repeatedly until the sum is less than 24 hours.

You can also specify fractional values for hours, minutes, or seconds.

To convert a time that is a string, use the TIMEVALUE function.

---

### Examples

TIME(12, 0, 0) returns 12:00 PM.

---

TIME(16, 45, 30) returns 4:45 PM.

---

TIME(0, 900, 0) returns 3:00 PM.

---

TIME(60, 0, 0) returns 12:00 PM.

---

TIME(4.25, 0, 0) returns 4:00 AM.

---

## TIMEVALUE

The TIMEVALUE function converts a date, a time, or a text string to a decimal fraction of a 24-hour day.

**TIMEVALUE**(*date-time*)

- *date-time*: A date, a time, or a text string in any of the Numbers date and time formats.

### Notes

To convert a time that is formatted as a time value instead of a string, use the TIME function.

---

### Examples

TIMEVALUE("4/6/88 12:00") returns 0.5 (noon represents one-half of the day).

TIMEVALUE("12:00:59") returns 0.5007 (rounded to four decimal places of accuracy).

TIMEVALUE("9:00 pm") returns 0.875 (21 hours, or 9 PM, divided by 24).

---

## TODAY

The TODAY function gets the current system date and formats the cell to display just the date, not the time. The time is always set to 12:00.

**TODAY**()

- No arguments (but you must include the parentheses).

### Notes

The displayed date is updated every time you open or modify your document.

You can use the NOW function to get the current date and time already formatted to display both.

---

### Examples

When calculated on April 6, 1988, TODAY() returns Apr 6, 1988.

---

## TRIM

The TRIM function removes extra spaces from text. TRIM removes all spaces before the first character, all spaces after the last character, and all duplicate spaces between characters, leaving only single spaces between words.

**TRIM**(text)

- *text*: The text from which you want to remove extra spaces.

---

### Examples

TRIM(" spaces spaces spaces ") returns "spaces spaces spaces".

---

## TRUE

The TRUE function returns the Boolean value TRUE. It is included so you can use spreadsheets created with some older spreadsheet applications. You can specify a Boolean value of TRUE by simply typing "true" (without quotation marks) into a cell or function argument.

**TRUE**()

- No arguments (but you must include the parentheses).

### Notes

You can type the word TRUE into a cell or formula instead of using the TRUE() function.

---

### Examples

TRUE() returns the Boolean value TRUE.

---

AND(1,TRUE()) returns the Boolean value TRUE.

---

AND(1,TRUE) behaves exactly like the preceding example.

---

## TRUNC

The TRUNC function truncates a decimal number to the specified number of digits.

**TRUNC**(number, [digits])

- *number*: A numeric expression indicating the number you want to truncate.
- *digits*: Optional; the number of digits of the result relative to the decimal point. A positive number represents digits (decimal places) to the right of the decimal point. A negative number specifies digits to the left of the decimal point, which are replaced with zeros. If omitted, 0 is used.

---

### Examples

TRUNC(1.49,0) returns 1.

---

TRUNC(1.50,0) returns 1.

---

TRUNC(1.23456,3) returns 1.234.

---

TRUNC(1111.222,-2) returns 1100.

---

TRUNC(-2.2,0) returns -2.

---

TRUNC(-2.8,0) returns -2.

---

## UPPER

The UPPER function converts text to uppercase.

**UPPER**(*text*)

- *text*: The text you want to convert to uppercase.

---

### Examples

UPPER("a b c") returns "A B C".

---

UPPER("First") returns "FIRST".

---

## VALUE

The VALUE function converts a number formatted as text into a regular number.

**VALUE**(*text*)

- *text*: The text-formatted number you want to convert.

### Notes

You'll probably never need to use the VALUE function; Numbers converts numbers in text automatically for you. The VALUE function is included so you can use spreadsheets created with some older spreadsheet applications.

---

### Examples

VALUE("22") returns the number 22.

---

VALUE(RIGHT("The year 1953", 2)) returns the number 53.

---

## VAR

The VAR function calculates the sample (unbiased) variance of a set of values.

**VAR**(*number*, [*number*, ...])

- *number*: One or more numbers or numeric expressions, or one or more references to numbers or numeric expressions.

## Notes

The VAR function divides the sum of the squares of the deviations of the data points by one less than the number of values to find the sample, or unbiased, variance (as opposed to the population, or true, variance). This is appropriate if the data points are only a sample of a larger data set. If the specified numbers make up the entire data set, you should use the VARP function to find the population (true) variance.

---

### Examples

VAR(5, 5, 5, 5, 6) returns a variance of 0.2 based on an average of 5.2.

---

VAR(1, 2, 3, 4, 5) returns a variance of 2.5 based on an average of 3.

---

VAR(1, 1, 1, 1, 6) returns a variance of 5 based on an average of 2.

---

VAR(2, 2, 4, 6, 6) returns a variance of 4 based on an average of 4.

---

## VARA

The VARA function calculates the sample (unbiased) variance of a set of values, including text and Boolean values. Text values and the Boolean value FALSE are included as if they are the number 0, logical TRUE as a 1.

**VARA**(*value*, [*value*, ...])

- *value*: One or more numeric or Boolean values or references to cells containing numeric, textual, or Boolean values.

## Notes

The VARA function divides the sum of the squares of the deviations of the data points by one less than the number of values to find the sample, or unbiased, variance (as opposed to the population, or true, variance). This is appropriate if the data points are only a sample of a larger data set. If the specified numbers make up the entire data set, you should use the VARP function to find the population (true) variance.

For a data set containing only numbers, VARA returns the same result as VAR.

---

### Examples

VARA(TRUE, TRUE, TRUE, TRUE, 6) returns 5. Each TRUE counts as 1.

---

VARA("a", 3, 6, 3, "b") displays an error.

---

## VARP

The VARP function calculates the population (true) variance of a set of numbers.

**VARP**(*number*, [*number*, ...])

- *number*: One or more numbers or numeric expressions, or references to cells containing numbers or numeric expressions.

### Notes

The VARP function divides the sum of the squares of the deviations of the data points by the number of values to find the population, or true, variance (as opposed to the sample, or unbiased, variance). This is appropriate if the data points make up the entire data set. If the specified numbers are only a sample of a larger data set, you should use the VAR function to find the sample (unbiased) variance.

---

### Examples

VARP(5, 5, 5, 5, 6) returns a variance of 0.16 based on an average of 5.2.

---

VARP(1, 2, 3, 4, 5) returns a variance of 2 based on an average of 3.

---

VARP(1, 1, 1, 1, 6) returns a variance of 4 based on an average of 2.

---

VARP(2, 2, 4, 6, 6) returns a variance of 3.2 based on an average of 4.

---

## VARPA

The VARPA function calculates the population (true) variance of a set of values, including text values and Boolean values. Text values and the Boolean value FALSE are included as if they are the number 0, logical TRUE as a 1.

**VARPA**(*value*, [*value*, ...])

- *value*: One or more numeric or Boolean values or references to cells containing numeric, textual, or Boolean values.

### Notes

The VARPA function divides the sum of the squares of the deviations of the data points by the number of values to find the population, or true, variance (as opposed to the sample, or unbiased, variance). This is appropriate if the data points make up the entire data set. If the specified numbers are only a sample of a larger data set, you should use the VARA function to find the sample (unbiased) variance.

For a data set containing only numbers, VARPA returns the same result as VARP.

---

### Examples

VARPA(TRUE, TRUE, TRUE, TRUE, 6) returns 4. Each TRUE counts as 1.

---

VARPA("a", 3, 6, 3, "b") displays an error.

---

## VDB

The VDB (variable declining balance) function calculates the depreciation of an asset over a chosen time interval, using either the double-declining method or another rate that you specify.

**VDB**(*cost, salvage, life, start, end, [factor], [no-switch]*)

- *cost*: The initial cost of the asset.
- *salvage*: The salvage value of the asset.
- *life*: The number of periods over which the asset is depreciated.
- *start*: The first period for which you want to start the depreciation calculation.
- *end*: The last period you want to include in the depreciation calculation.
- *factor*: Optional; a number that determines the depreciation rate. The higher the number, the more rapid the depreciation. If omitted, 2 (for double-declining) is assumed.
- *no-switch*: Optional; controls whether the function switches to straight-line depreciation when that value is greater than the amount from the variable declining method.

---

### Examples

If A2:E2 contains 10000, 1000, 9, 0, 1:

VDB(A2, B2, C2, D2, E2) returns \$2222.22, the first year's depreciation for a \$10,000 asset with a 9-year life at the end of which it can be salvaged for \$1,000.

---

VDB(A2, B2, C2, 1, 2) returns \$1,728.40, the second year's depreciation.

---

VDB(A2, B2, C2, 8, 9, 2, FALSE) returns \$339.20, the last year's depreciation if allowed to switch to straight-line depreciation.

---

VDB(A2, B2, C2, 8, 9, 2, TRUE) returns \$297.60, the last year's depreciation if not allowed to switch to straight-line depreciation.

---

VDB(1000, 100, 4, 0, 1) returns \$500.

---

## VLOOKUP

The VLOOKUP function retrieves a value from a range of columns by using a match with a left column value to choose the row and a column number to choose the column in that row.

**VLOOKUP**(*search-value*, *cell-range*, *column*, [*exact-match*])

- *search-value*: The value you want to look for in the left column of the range to choose a row.
- *cell-range*: The range of cells containing your data. The left column contains the data to be searched; the remaining rows contain values you can retrieve.
- *column*: A number that specifies the relative column number of the cell from which you want to retrieve the value. The left column of the range is column 1.
- *exact-match*: Optional Boolean value; determines whether an exact value is required: TRUE, 1, or omitted selects the column with the largest top-row value that is less than the search value if there is no exact match.  
FALSE or 0 returns an error if there is no exact match.

---

### Examples

Given the following table:

	A	B	C	D	E	F
1						
2		0	A	lorem	1	
3		20	E	ipsum	2	
4		40	I	dolor	3	
5		60	O	sit	4	
6		80	U	amet	5	
7						

---

VLOOKUP(20, B2:E6, 2) returns E.

---

VLOOKUP(21, B2:E6, 2) returns E.

---

VLOOKUP("M", C2:E6, 2) returns dolor.

---

VLOOKUP("blandit", D2:E6, 2) returns 5.

---

VLOOKUP(21, B2:E6, 2, FALSE) returns an error because no value in the left column exactly matches 21.

---

## WEEKDAY

The WEEKDAY function converts a date to a number that represents the day of the week using one of three numbering schemes.

**WEEKDAY**(*date-time*, [*number-scheme*])

- *date-time*: A date in any of the accepted date formats or a reference to a cell containing such a date.
- *number-scheme*: Optional; a single digit that specifies how days are numbered:
  - 1 or omitted counts Sunday = day 1, Saturday = day 7.
  - 2 counts Monday = 1 through Sunday = 7.
  - 3 counts Monday = 0 through Sunday = 6.

---

### Examples

WEEKDAY("Apr 6, 1988", 1) returns 4 (Wednesday, the fourth day if you start counting Sunday as day 1).

---

WEEKDAY("Apr 6, 1988") returns the same value as the preceding example (numbering scheme 1 is used if no number-scheme argument is specified).

---

WEEKDAY("Apr 6, 1988", 2) returns 3 (Wednesday, the third day if you start counting Monday as day 1).

---

WEEKDAY("Apr 6, 1988", 3) returns 2 (Wednesday, day number 2 if you start counting Monday as day 0).

---

## YEAR

The YEAR function extracts the year number from a date.

**YEAR**(*date-time*)

- *date-time*: A date or a reference to a cell containing a date.

---

### Examples

YEAR("April 6, 1988") returns 1988.

---

YEAR(NOW()) returns 2006 when evaluated on June 4, 2006.

---

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