Chapter 2

Manual Calculations

2-1 Basic Calculations

■ Arithmetic Calculations

- Enter arithmetic calculations as they are written, from left to right.
- Use the (−) key to input the minus sign before a negative value.
- Calculations are performed internally with a 15-digit mantissa. The result is rounded to a 10-digit mantissa before it is displayed.
- For mixed arithmetic calculations, multiplication and division are given priority over addition and subtraction.

Example	Operation	Display
23 + 4.5 – 53 = –25.5	**23 + 4.5 − 53 EXE**	**–25.5**
56 × (–12) ÷ (–2.5) = 268.8	**56 × (−) 12 ÷ (−) 2.5 EXE**	**268.8**
$(2 + 3) \times 10^2 = 500$	**(2 + 3) × 1 EXP 2 EXE** *1	**500**
$1 + 2 - \underline{3 \times 4 \div 5} + 6 = 6.6$	**1 + 2 − 3 × 4 ÷ 5 + 6 EXE**	**6.6**
100 – (2 + 3) × 4 = 80	**100 − (2 + 3) × 4 EXE**	**80**
2 + 3 × (4 + 5) = 29	**2 + 3 × (4 + 5 EXE** *2	**29**
(7 – 2) × (8 + 5) = 65	**(7 − 2) (8 + 5) EXE** *3	**65**
$\frac{6}{4 \times 5} = 0.3$	**6 ÷ (4 × 5) EXE** *4	**0.3**

*1 "(2 + 3) EXP 2" does not produce the correct result. Be sure to enter this calculation as shown.

*2 The final closed parentheses (immediately before operation of the EXE key) may be omitted, no matter how many are required.

*3 A multiplication sign immediately before an open parenthesis may be omitted.

*4 This is identical to 6 ÷ 4 ÷ 5 EXE.

■ Number of Decimal Places, Number of Significant Digits, Exponential Notation Range

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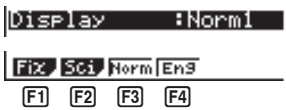
- These settings can be made while setting up the display format (Display) with the set up screen.



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- Even after you specify the number of decimal places or the number of significant digits, internal calculations are still performed using a 15-digit mantissa, and displayed values are stored with a 10-digit mantissa. Use Rnd ([F4]) of the Numeric Calculation Menu (NUM) to round the displayed value off to the number of decimal place and number of significant digit settings.
- Number of decimal place and number of significant digit settings remain in effect until you change them or until you change the exponential display range (Norm) setting.
- To change the exponential display range (Norm) setting, press [F3] (Norm) while the display format (Display) menu is on the screen. Each time you perform this operation, the range toggles between the following two settings.

  Norm 1 ..... exponential display for values outside the range of 10^{-2} to 10^{10}

  Norm 2 ..... exponential display for values outside the range of 10^{-9} to 10^{10}

Example **100 ÷ 6 = 16.66666666...**

Condition	Operation	Display
	100 [÷] 6 [EXE]	16.66666667
4 decimal places	[SHIFT] [SET UP] (▼)(▼)(▼)(▼)(▼)(▼)(▼)(▼)(▼) [F1] (Fix) [F5] (4) [EXIT] [EXE]	16.6667 *1
5 significant digits	[SHIFT] [SET UP] (▼)(▼)(▼)(▼)(▼)(▼)(▼)(▼)(▼) [F2] (Sci) [F6] (▷) [F1] (5) [EXIT] [EXE]	1.6667E+01 *1
Cancels specification	[SHIFT] [SET UP] (▼)(▼)(▼)(▼)(▼)(▼)(▼)(▼)(▼) [F3] (Norm) [EXIT] [EXE]	16.66666667

*1 Displayed values are rounded off to the place you specify.

Example **200 ÷ 7 × 14 = 400**

Condition	Operation	Display
	200 [÷] 7 [×] 14 [EXE]	400
3 decimal places	[SHIFT] [SET UP] (▼)(▼)(▼)(▼)(▼)(▼)(▼)(▼)(▼) [F1] (Fix) [F4] (3) [EXIT] [EXE]	400.000
Calculation continues using display capacity of 10 digits	200 [÷] 7 [EXE]	28.571
	[×]	Ans × _
	14 [EXE]	400.000

• If the same calculation is performed using the specified number of digits:

	200 ÷ 7 EXE	28.571
The value stored internally is cut off to the number of decimal places you specify.	OPTN F6 (▷)	
	F4 (NUM) F4 (Rnd) EXE	28.571
	×	Ans × _
	14 EXE	399.994

■ Calculations Using Variables

Example	Operation	Display
	193.2 → ALPHA A EXE	193.2
193.2 ÷ 23 = 8.4	ALPHA A ÷ 23 EXE	8.4
193.2 ÷ 28 = 6.9	ALPHA A ÷ 28 EXE	6.9

2-2 Special Functions

■ Answer Function

The unit's Answer Function automatically stores the last result you calculated by pressing [EXE] (unless the [EXE] key operation results in an error). The result is stored in the answer memory.

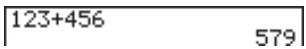
●To recall the contents of the answer memory

[SHIFT] [Ans] [EXE]

●To use the contents of the answer memory in a calculation

Example **123 + 456 = 579**
789 – 579 = 210

[AC] [1] [2] [3] [+] [4] [5] [6] [EXE]



[7] [8] [9] [−] [SHIFT] [Ans] [EXE]

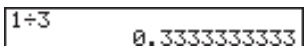
- The largest value that the answer memory can hold is one with 15 digits for the mantissa and 2 digits for the exponent.
- Answer memory contents are not cleared when you press the [AC] key or when you switch power off.
- Note that answer memory contents are not changed by an operation that assigns values to value memory (such as: [5] [→] [ALPHA] [A] [EXE]).

■ Performing Continuous Calculations

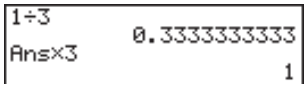
The unit lets you use the result of one calculation as one of the arguments in the next calculation. To do so, use the result of the previous calculation, which is currently stored in Answer Memory.

Example **1 ÷ 3 =**
1 ÷ 3 × 3 =

[AC] [1] [÷] [3] [EXE]



(Continuing)
[×] [3] [EXE]



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Continuous calculations can also be used with Type A functions (x^2, x^{-1}, $x!$), +, –, ^(x^y), $\sqrt[x]{\ }$, ° ’ ”.

■ Using the Replay Function

The Replay Function automatically stores the last calculation performed into replay memory. You can recall the contents of the replay memory by pressing ◀ or ▶. If you press ▶, the calculation appears with the cursor at the beginning. Pressing ◀ causes the calculation to appear with the cursor at the end. You can make changes in the calculation as you wish and then execute it again.

Example **To perform the following two calculations**

$4.12 \times \underline{6.4} = 26.368$

$4.12 \times \underline{7.1} = 29.252$

[AC] [4] [•] [1] [2] [×] [6] [•] [4] [EXE]

```
4.12×6.4
                26.368
```

◀◀◀◀

```
4.12×6.4
```

[7] [•] [1]

```
4.12×7.1_
```

[EXE]

```
4.12×7.1
                29.252
```

- A calculation remains stored in replay memory until you perform another calculation or change modes.
- The contents of the replay memory are not cleared when you press the [AC] key, so you can recall a calculation and execute it even after performing the all clear operation. Note, however, that replay memory contents are cleared whenever you change to another mode or menu.
- After you press [AC], you can press ▲ or ▼ to recall previous calculations, in sequence from the newest to the oldest (Multi-Replay Function). Once you recall a calculation, you can use ▶ and ◀ to move the cursor around the calculation and make changes in it to create a new calculation. Note, however, that multi-replay memory contents are cleared whenever you change to another menu.

■ Making Corrections in the Original Calculation

Example **$14 \div 0 \times 2.3$ entered by mistake for $14 \div 10 \times 2.3$**

[AC] [1] [4] [÷] [0] [×] [2] [•] [3] [EXE]

```
14÷0×2.3


      Ma  ERROR
```

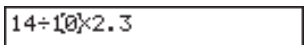
Press ◀ or ▶.

```
14÷0×2.3
```

Cursor is positioned automatically at the location of the cause of the error.

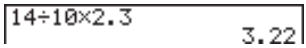
Make necessary changes.

◀ SHIFT INS 1



Execute it again.

EXE



■ Using Multistatements

Multistatements are formed by connecting a number of individual statements for sequential execution. You can use multistatements in manual calculations and in programmed calculations. There are two different ways that you can use to connect statements to form multistatements.

• Colon (:)

Statements that are connected with colons are executed from left to right, without stopping.

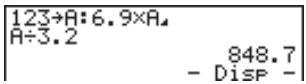
• Display Result Command (◢)

When execution reaches the end of a statement followed by a display result command, execution stops and the result up to that point appears on the display. You can resume execution by pressing the EXE key.

●To use multistatements

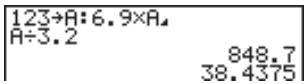
Example **6.9 × 123 = 848.7**
123 ÷ 3.2 = 38.4375

AC 1 2 3 → ALPHA A
SHIFT PRGM F6 (▷) F5 (:)
6 • 9 × ALPHA A SHIFT PRGM F5 (◢)
ALPHA A ÷ 3 • 2 EXE



Intermediate result at point where "◢" is used.

EXE



- Note that the final result of a multistatement is always displayed, regardless of whether it ends with a display result command.
- You cannot construct a multistatement in which one statement directly uses the result of the previous statement.

Example **123 × 456: × 5**

Invalid

2-3 Function Calculations

■ Function Menus

This calculator includes five function menus that give you access to scientific functions that are not printed on the key panel.

- The contents of the function menu differ according to the mode you entered from the Main Menu before you pressed the [OPTN] key. The following examples show function menus that appear in the RUN or PRGM Mode.

●Hyperbolic Calculations (HYP)

[OPTN] [F6] (▷) [F2] (HYP)

[F1] (sinh) ..... Hyperbolic sine
[F2] (cosh) ..... Hyperbolic cosine
[F3] (tanh) ..... Hyperbolic tangent
[F4] ($\sinh^{-1}$) ..... Inverse hyperbolic sine
[F5] ($\cosh^{-1}$) ..... Inverse hyperbolic cosine
[F6] ($\tanh^{-1}$) ..... Inverse hyperbolic tangent

●Probability/Distribution Calculations (PROB)

[OPTN] [F6] (▷) [F3] (PROB)

[F1] (x!) ..... Input a value and select this item to obtain the factorial of the value.
[F2] (nPr) ..... Permutation
[F3] (nCr) ..... Combination
[F4] (Ran#) ..... Pseudo random number in the range of 0 to 1 (10 decimal places).
[F6] (▷) ..... Next menu

[F6] (▷)

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[F1] (P ( ) ..... Probability P (t)
[F2] (Q ( ) ..... Probability Q (t)
[F3] (R ( ) ..... Probability R (t)
[F4] (t ( ) ..... Normalized variate t (x) value
[F6] (▷) ..... Previous menu

●Numeric Calculations (NUM)

OPTN F6 (▷) F4 (NUM)

F1 (Abs) ..... Select this item and input a value to obtain the absolute value of the value.

F2 (Int) ..... Select this item and input a value to extract the integer part of the value.

F3 (Frac) ..... Select this item and input a value to extract the fraction part of the value.

F4 (Rnd) ..... Rounds off the value used for internal calculations to 10 significant digits (to match the value in the Answer Memory), or to the number of decimal places (Fix) and number of significant digits (Sci) specified by you.

F5 (Intg) ..... Select this item and input a value to obtain the largest integer that is not greater than the value.

●Angle Units, Coordinate Conversion, Sexagesimal Operations (ANGL)

OPTN F6 (▷) F5 (ANGL)

F1 (°) ..... Specifies degrees for a specific input value.

F2 (r) ..... Specifies radians for a specific input value.

F3 (g) ..... Specifies grads for a specific input value.

F4 (° ' ") ..... Specifies degrees (hours), minutes, seconds when inputting a sexagesimal value.

F5 ($\overleftarrow{\circ\ '\ ''}$) ..... Converts decimal value to sexagesimal value.

F6 (▷) ..... Next menu

F6 (▷)

F1 (Pol() ..... Rectangular-to-polar coordinate conversion

F2 (Rec() ..... Polar-to-rectangular coordinate conversion

F6 (▷) ..... Previous menu

• The $\overleftarrow{\circ\ '\ ''}$ menu option appears only when there is a calculation result shown on the display.

●Engineering Notation Calculations (ESYM)

OPTN F6 (▷) F6 (▷) F1 (ESYM)

F1 (m) ..... milli (10^{-3})
F2 (μ) ..... micro (10^{-6})
F3 (n) ..... nano (10^{-9})
F4 (p) ..... pico (10^{-12})
F5 (f) ..... femto (10^{-15})
F6 (▷) ..... Next menu

F6 (▷)

F1 (k) ..... kilo (10^{3})
F2 (M) ..... mega (10^{6})
F3 (G) ..... giga (10^{9})
F4 (T) ..... tera (10^{12})
F5 (P) ..... peta (10^{15})
F6 (▷) ..... Next menu

F6 (▷)

F1 (E) ..... exa (10^{18})
F2 (ENG) ..... Shifts the decimal place of the displayed value three digits to the left and decreases its exponent by three. When you are using engineering notation, the engineering symbol is also changed accordingly (i.e. m → μ).
F3 ($\overleftarrow{\text{ENG}}$) ..... Shifts the decimal place of the displayed value three digits to the right and increases its exponent by three. When you are using engineering notation, the engineering symbol is also changed accordingly (i.e. μ → m).
F6 (▷) ..... Previous menu

• The ENG and $\overleftarrow{\text{ENG}}$ menu options appear only when there is a calculation result shown on the display.

■ Angle Units

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- Once you specify an angle unit, it remains in effect until you specify a different one. The specification is retained even if you switch power off.

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- Be sure to specify “Comp” for Calculation/Binary, Octal, Decimal, Hexadecimal Setting Mode.

Example	Operation	Display
To convert 4.25 rad to degrees:	[SHIFT] [SETUP] [▼][▼][▼][▼] [F1](Deg) [EXIT] **4.25** [OPTN] [F6](▷) [F5](ANGL) [F2](r) [EXE]	**243.5070629**
47.3° + 82.5rad = 4774.20181°	**47.3** [+] **82.5** [F2](r) [EXE]	**4774.20181**

■ Trigonometric and Inverse Trigonometric Functions

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- Be sure to set the angle unit before performing trigonometric function and inverse trigonometric function calculations.

$$(90° = \frac{\pi}{2} \text{ radians} = 100 \text{ grads})$$

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- Be sure to specify “Comp” for Calculation/Binary, Octal, Decimal, Hexadecimal Setting Mode.

Example	Operation	Display
sin 63° = 0.8910065242	[SHIFT] [SETUP] [▼][▼][▼][▼] [F1](Deg) [EXIT] [sin] **63** [EXE]	**0.8910065242**
$\cos(\frac{\pi}{3}\text{rad}) = 0.5$	[SHIFT] [SETUP] [▼][▼][▼][▼] [F2](Rad) [EXIT] [cos] [(] [SHIFT] [π] [÷] [3] [)] [EXE]	**0.5**
tan (– 35gra) = – 0.6128007881	[SHIFT] [SETUP] [▼][▼][▼][▼] [F3](Gra) [EXIT] [tan] [(−)] **35** [EXE]	**–0.6128007881**
2 · sin 45° × cos 65° = 0.5976724775	[SHIFT] [SETUP] [▼][▼][▼][▼] [F1](Deg) [EXIT] **2** [×] [sin] **45** [×] [cos] **65** [EXE] *1	**0.5976724775**
$\text{cosec } 30° = \frac{1}{\sin 30°} = 2$	**1** [÷] [sin] **30** [EXE]	**2**
$\sin^{-1}0.5 = 30°$ (x when $\sin x = 0.5$)	[SHIFT] [sin^{-1}] **0.5** *2 [EXE]	**30**

*1 [×] can be omitted.

*2 Input of leading zero is not necessary.

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■ Logarithmic and Exponential Functions

• Be sure to specify "Comp" for Calculation/Binary, Octal, Decimal, Hexadecimal Setting Mode.

Example	Operation	Display
log 1.23 ($\log_{10}1.23$) $= 8.990511144 \times 10^{-2}$	log **1.23** EXE	**0.08990511144**
ln 90 ($\log_e 90$) = 4.49980967	ln **90** EXE	**4.49980967**
$10^{1.23} = 16.98243652$ (To obtain the antilogarithm of common logarithm 1.23)	SHIFT 10^x **1.23** EXE	**16.98243652**
$e^{4.5} = 90.0171313$ (To obtain the antilogarithm of natural logarithm 4.5)	SHIFT e^x **4.5** EXE	**90.0171313**
$(-3)^4 = (-3) \times (-3) \times (-3) \times (-3) = 81$	((−) **3**) x^2 **4** EXE	**81**
$-3^4 = -(3 \times 3 \times 3 \times 3) = -81$	(−) **3** x^2 **4** EXE	**– 81**
$\sqrt[7]{123}$ $(= 123^{\frac{1}{7}})$ $= 1.988647795$	**7** SHIFT $\sqrt{\square}$ **123** EXE	**1.988647795**
$2 + 3 \times \sqrt[3]{64} - 4 = 10$	**2** + **3** × **3** SHIFT $\sqrt{\square}$ **64** − **4** EXE *1	**10**

*1 ^ (x^y) and $\sqrt[x]{\square}$ take precedence over multiplication and division.

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■ Hyperbolic and Inverse Hyperbolic Functions

• Be sure to specify "Comp" for Calculation/Binary, Octal, Decimal, Hexadecimal Setting Mode.

Example	Operation	Display
sinh 3.6 = 18.28545536	OPTN F6 (▷) F2 (HYP) F1 (sinh) **3.6** EXE	**18.28545536**
cosh 1.5 – sinh 1.5 $= 0.2231301601$ $= e^{-1.5}$ (Proof of cosh $x \pm$ sinh $x = e^{\pm x}$)	OPTN F6 (▷) F2 (HYP) F2 (cosh) **1.5** − F1 (sinh) **1.5** EXE ln SHIFT Ans EXE	**0.2231301601** **– 1.5**
$\cosh^{-1}\left(\frac{20}{15}\right) = 0.7953654612$	OPTN F6 (▷) F2 (HYP) F5 ($\cosh^{-1}$) (**20** ÷ **15**) EXE	**0.7953654612**
Determine the value of x when tanh 4 $x = 0.88$ $x = \frac{\tanh^{-1} 0.88}{4}$ $= 0.3439419141$	OPTN F6 (▷) F2 (HYP) F6 ($\tanh^{-1}$) **0.88** ÷ **4** EXE	**0.3439419141**

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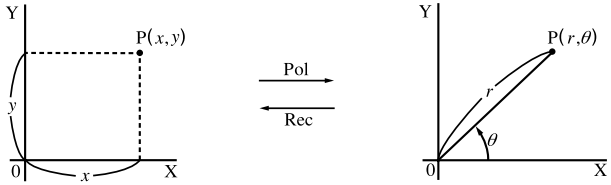
■ Other Functions

• Be sure to specify “Comp” for Calculation/Binary, Octal, Decimal, Hexadecimal Setting Mode.

Example	Operation	Display
$\sqrt{2}+\sqrt{5}=3.65028154$	SHIFT √ 2 + SHIFT √ 5 EXE	**3.65028154**
$(-3)^2=(-3)\times(-3)=9$	((−) 3) x^3 EXE	**9**
$-3^2=-(3\times3)=-9$	(−) 3 x^3 EXE	**– 9**
$\dfrac{1}{\frac{1}{3}-\frac{1}{4}}=12$	(3 SHIFT x^{-1} − 4 SHIFT x^{-1}) SHIFT x^{-1} EXE	**12**
8! (= 1 × 2 × 3 × .... × 8) = 40320	8 OPTN F6 (▷) F3 (PROB) F1 ($x!$) EXE	**40320**
$\sqrt[3]{36\times42\times49}=42$	SHIFT $\sqrt[3]{\ }$ (36 × 42 × 49) EXE	**42**
Random number generation (pseudo random number between 0 and 1.)	OPTN F6 (▷) F3 (PROB) F4 (Ran#) EXE	**(Ex.) 0.4810497011**
What is the absolute value of the common logarithm of $\frac{3}{4}$?		
$\left\lvert \log\frac{3}{4} \right\rvert = 0.1249387366$	OPTN F6 (▷) F4 (NUM) F1 (Abs) log (3 ÷ 4) EXE	**0.1249387366**
What is the integer part of – 3.5?	OPTN F6 (▷) F4 (NUM) F2 (Int) (−) 3.5 EXE	**– 3**
What is the decimal part of – 3.5?	OPTN F6 (▷) F4 (NUM) F3 (Frac) (−) 3.5 EXE	**– 0.5**
What is the nearest integer not exceeding – 3.5?	OPTN F6 (▷) F4 (NUM) F5 (Intg) (−) 3.5 EXE	**– 4**

■ Coordinate Conversion

• Rectangular Coordinates **• Polar Coordinates**



- With polar coordinates, θ can be calculated and displayed within a range of $-180° < \theta \leqq 180°$ (radians and grads have same range).

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- Be sure to specify "Comp" for Calculation/Binary, Octal, Decimal, Hexadecimal Setting Mode.

Example **To calculate r and $\theta°$ when x = 14 and y = 20.7**

Operation	Display
SHIFT SETUP ▼ ▼ ▼ ▼ F1 (Deg) EXIT OPTN F6 (▷) F5 (ANGL) F6 (▷) F1 (Pol() **14** , **20.7**) EXE	Ans 1 [24.989] → 24.98979792 (r) 2 [55.928] → 55.92839019 (θ)

Example **To calculate x and y when r = 25 and θ = 56°**

Operation	Display
SHIFT SETUP ▼ ▼ ▼ ▼ F1 (Deg) EXIT OPTN F6 (▷) F5 (ANGL) F6 (▷) F2 (Rec() **25** , **56**) EXE	Ans 1 [13.979] → 13.97982259 (x) 2 [20.725] → 20.72593931 (y)

■ Permutation and Combination

• Permutation

$$_nPr = \frac{n!}{(n-r)!}$$

• Combination

$$_nCr = \frac{n!}{r!\,(n-r)!}$$

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- Be sure to specify "Comp" for Calculation/Binary, Octal, Decimal, Hexadecimal Setting Mode.

Example **To calculate the possible number of different arrangements using 4 items selected from among 10 items**

Formula	Operation	Display
${}_{10}P_4 = 5040$	**10** [OPTN] [F6] (▷) [F3] (PROB) [F2] ($_nP_r$) **4** [EXE]	**5040**

Example **To calculate the possible number of different combinations of 4 items that can be selected from among 10 items**

Formula	Operation	Display
${}_{10}C_4 = 210$	**10** [OPTN] [F6] (▷) [F3] (PROB) [F3] ($_nC_r$) **4** [EXE]	**210**

■ Fractions

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- Fractional values are displayed with the integer first, followed by the numerator and then the denominator.
- Be sure to specify “Comp” for Calculation/Binary, Octal, Decimal, Hexadecimal Setting Mode.

Example	Operation	Display
$\frac{2}{5} + 3\frac{1}{4} = 3\frac{13}{20}$	**2** [a b/c] **5** [+] **3** [a b/c] **1** [a b/c] **4** [EXE]	**3⌟13⌟20**
$= 3.65$	(Conversion to decimal*1) [F↔D]	**3.65**
$\frac{1}{2578} + \frac{1}{4572}$ $= 6.066202547 \times 10^{-4}$	**1** [a b/c] **2578** [+] **1** [a b/c] **4572** [EXE]	**6.066202547E–04***2 (Norm 1 display format)
$\frac{1}{2} \times 0.5 = 0.25$	**1** [a b/c] **2** [×] [•] **5** [EXE]	**0.25***3
$\frac{1}{\frac{1}{3}+\frac{1}{4}} = 1\frac{5}{7}$	**1** [a b/c] [(] **1** [a b/c] **3** [+] **1** [a b/c] **4** [)] [EXE]*4	**1⌟5⌟7**

*1 Fractions can be converted to decimal values and vice versa.

*2 When the total number of characters, including integer, numerator, denominator and deliminater marks exceeds 10, the input fraction is automatically displayed in decimal format.

*3 Calculations containing both fractions and decimals are calculated in decimal format.

*4 You can include fractions within the numerator or denominator of a fraction by putting the numerator or denominator in parentheses.

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■ Engineering Notation Calculations

Input engineering symbols using the engineering notation menu.

- Be sure to specify “Comp” for Calculation/Binary, Octal, Decimal, Hexadecimal Setting Mode.

Example	Operation	Display
	[SHIFT] [SETUP] [▼] [▼] [▼] [▼] [▼] [▼] [▼] [▼] [▼] [F4](Eng) [EXIT]	
999k (kilo) + 25k (kilo) = 1.024M (mega)	**999** [OPTN]	
	[F6](▷) [F6](▷) [F1](ESYM)	
	[F6](▷) [F1](k) [+] **25** [F1](k) [EXE]	**1.024M**
9 ÷ 10 = 0.9 = 900m (milli)	**9** [÷] **10** [EXE]	**900.m**
	[OPTN] [F6](▷) [F6](▷) [F1](ESYM)	
	[F6](▷) [F6](▷)	
	[←] [F3](ENG)*1	**0.9**
	[←] [F3](ENG)*1	**0.0009k**
	[F2](ENG)*2	**0.9**
	[F2](ENG)*2	**900.m**

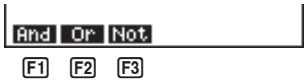
*1 Converts the displayed value to the next higher engineering unit, by shifting the decimal point three places to the right.

*2 Converts the displayed value to the next lower engineering unit, by shifting the decimal point three places to the left.

■ Logical Operators (AND, OR, NOT)

The logical operator menu lets you select the operator you need.

[OPTN] [F6] (▷) [F6] (▷) [F4] (LOGIC)



[F1] (And) ..... AND (logical multiplication)

[F2] (Or) ..... OR (logical addition)

[F3] (Not) ..... NOT (negation)

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- Be sure to specify “Comp” for Calculation/Binary, Octal, Decimal, Hexadecimal Setting Mode.

Example **What is the logical product of A and B when A = 3 and B = 2?**
A AND B = 1

Operation	Display
3 → [ALPHA] [A] [EXE] 2 → [ALPHA] [B] [EXE] [ALPHA] [A] [OPTN] [F6] (▷) [F6] (▷) [F4] (LOGIC) [F1] (And) [ALPHA] [B] [EXE]	1

Example **What is the logical sum of A and B when A = 5 and B = 1?**
A OR B = 1

Operation	Display
5 → [ALPHA] [A] [EXE] 1 → [ALPHA] [B] [EXE] [ALPHA] [A] [OPTN] [F6] (▷) [F6] (▷) [F4] (LOGIC) [F2] (Or) [ALPHA] [B] [EXE]	1

Example **Negate A when A = 10.**
NOT A = 0

Operation	Display
10 → [ALPHA] [A] [EXE] [OPTN] [F6] (▷) [F6] (▷) [F4] (LOGIC) [F3] (Not) [ALPHA] [A] [EXE]	0

About Logical Operations

- A logical operation always produces either 0 or 1 as its result.
- The following table shows all of possible results that can be produced by AND and OR operations.

Value or Expression A	Value or Expression B	A AND B	A OR B
A ≠ 0	B ≠ 0	1	1
A ≠ 0	B = 0	0	1
A = 0	B ≠ 0	0	1
A = 0	B = 0	0	0

- The following table shows the results produced by the NOT operation.

Value or Expression A	NOT A
A ≠ 0	0
A = 0	1