Chapter 1: Equations
Timeline: 13 days

mmon Core Standards

A.SSE.1 Interpret expressions that represent a quantity in terms of its context (Modeling standard).

N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.

N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.

Textbook Correlations	2007 SC Standards	CCSS	Vocabulary	Resources/Examples
1-1 Variables and Expressions	EA 1.1 EA 2.6	A.SSE.1 N.Q.1	Variable Constant Numerical expression Algebraic expression Evaluate	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 1-1 Graphing Calculator Lab Challenge Activity Exploration
1-2 Solving Equations by Adding or Subtracting	EA 4.7	A.REI.1 A.REI.3 A.CED.1	Equation Addition and subtraction property of equality Solution of an equation	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 1-2 Graphing Calculator lab Challenge Activity

1-3 Solving Equations by Multiplying or Dividing	EA 4.7	A.REI.3 A.REI.1 A.CED.1	Multiplication and division property of equality	 Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention Challenge Activity
1-4 Solving Two-Step and Multi-Step	EA 4.7	A.REI.1 A.REI.3 A.CED.1		 Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 1-4 Graphing Calculator Lab Challenge Activity
1-5 Solving Equations with Variables on Both Sides	EA 4.7	A.REI.1 A.REI.3 A.CED.1	Identity	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 1-5 Graphing Calculator Lab Challenge Activity
1-6 Solving for a Variable	EA 3.7	A.CED.4 A.REI.3 N.Q.1	Formula Literal Equation	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention Challenge Activity
1-7 Solving Absolute-Value Equations	EA 4.7	A.CED.1 A.REI.3		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention Challenge Activity

1-8 Rates, Ratios, and Proportions	EA 3.8	N.Q.1 A.CED.1 A.REI.3	Ratio Rate Scale Unit rate Conversion factor Proportion Cross products Scale drawing Scale model Dimensional analysis	 Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 1-8 Graphing Calculator Lab Challenge Activity
1-9 Applications of Proportions	EA 3.8	N.Q.1 A.CED.1 A.REI.3	Similar Corresponding sides Corresponding angles Indirect measurement Scale factor	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention 1-9 Graphing Calculator Lab Challenge Activity

Chapter 2: Inequalities
Timeline: 7 days

mmon Core Standards

A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

Textbook Correlations	2007 SC Standards	CCSS	Vocabulary	Resources/Examples
2-1 Graphing and Writing Inequalities	EA 4.8 EA 5.12	A.REI.3	Inequality Solution of an inequality	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Challenge Activity
2-2 Solving Inequalities by Adding or Subtracting	EA 4.8 EA 5.12	A.REI.3		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 2-2 Graphing Calculator Lab Challenge Activity
2-3 Solving Inequalities by Multiplying and Dividing	EA 4.8 EA 5.12	A.REI.3 A.CED.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 2-3 Graphing Calculator Lab Challenge Activity
2-4 Solving Two-Step and Multi-Step Inequalities	EA 4.8 EA 5.12	A.REI.3 A.CED.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 2-4 Graphing Calculator Lab Challenge Activity

2-5 Solving Inequalities with Variables on Both Sides	EA 4.8 EA 5.12	A.REI.3 A.CED.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 2-5 Graphing Calculator Activity Challenge Activity
2-6 Solving Compound Inequalities	EA 4.8 EA 5.12	A.REI.3	Compound inequality Intersection Union	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention Challenge Activity
2-7 Solving Absolute-Value Inequalities	EA 4.8 EA 5.12	A.REI.3 A.CED.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention Challenge Activity

Chapter 3: Functions
Timeline: 7 days

mmon Core Standards

F.IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).

F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n + 1) = f(n) + f(n - 1)$ for $n \geq 1$.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

F.BF.1 Write a function that describes a relationship between two quantities.

F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

Textbook Correlations	2007 SC Standards	CCSS	Vocabulary	Resources/Examples
3-1 Graphing Relationships	EA 3.4	F.IF.4 N.Q.2	Continuous graph Discrete graph	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 3-1 Graphing Calculator Lab Challenge Activity
3-2 Relations and Functions	EA 3.1	F.IF.1 F.IF.5	Relation Domain Range Function	 Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 3-2 Graphing Calculator Lab Challenge Activity
3-3 Writing Functions	EA 3.2 EA 3.3	F.IF.2 F.IF.1 F.IF.5 A.CED.3 F.BF.1 F.LE.2	Independent variable Dependent variable Function rule Function notation	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 3-3 Graphing Calculator Lab Challenge Activity
3-4 Graphing Functions	EA 5.1	F.IF.5 F.IF.1 F.IF.2 F.IF.7 A.REI.10		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 3-4 Graphing Calculator Lab Challenge Activity
3-5 Scatter Plots and Trend Lines	EA 4.4 EA 4.5 DA 3.7	S.ID.6 N.Q.1	Scatter Plot Correlation Positive correlation Negative correlation No correlation Trend line	TI Graphing Calculator Activity Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 3-5 Graphing Calculator Lab Challenge Activity

3-6 Arithmetic Sequences	IA 6.1 IA 6.2	F.IF.3 F.BF.2 F.LE.2	Sequence Term Ellipsis Arithmetic sequence Common difference	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention Challenge Activity

Chapter 4: Linear Functions
Timeline: 11 days

mmon Core Standards

A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.

F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

F.BF.1 Write a function that describes a relationship between two quantities.

F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

S.ID.6b Informally assess the fit of a function by plotting and analyzing residuals.

S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.

S.ID.9 Distinguish between correlation and causation.

G.GPE.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

Textbook Correlations	2007 SC Standard	CCSS	Vocabulary	Resources/Examples
4-1 Identifying Linear Functions	EA 5.10	A.REI.10 F.IF.7 A.CED.2 F.IF.5 F.LE.2	Linear function Linear equation Standard form	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention 4-1 Graphing Calculator Lab Challenge Activity
4-2 Using Intercepts	EA 5.5	F.IF.7 A.CED.2 A.CED.3 F.IF.2 F.IF.4 F.IF.5	*y*-intercept *x*-intercept Find and graph	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention Challenge Activity
4-3 Rate of Change and Slope	EA 5.6 EA 5.7	F.IF.6	Rate of change Rise Run Slope Types of Slopes Horizontal change Vertical change	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 4-3 Graphing Calculator Lab Challenge Activity
4-4 The Slope Formula	EA 5.6	F.IF.6	Subscripts	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Challenge Activity
4-5 Direct Variation	EA 3.5 EA 3.6 EA 3.8	A.CED.2 A.FLE.1 A.FLE.2	Direct variation Constant of variation	SMART

		A.CED.3 F.IF.5 F.IF.7		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Challenge Activity
4-6 Slope-Intercept Form	EA 4.1 EA 5.1 EA 5.2 EA 5.3 EA 5.10	A.CED.2 A.CED.3 F.IF.7 F.IF.6 F.BF.1 F.LE.2		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 4-6 Graphing Calculator Lab Challenge Activity
4-7 Point-Slope Form	EA 4.2 EA 4.3 EA 4.6 EA 4.7 EA 5.4	A.CED.2 A.CED.3 F.IF.7 F.BF.1 F.LE.2		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention 4-7 Graphing Calculator Lab Challenge Activity
4-8 Line of Best Fit	EA 4.4 EA 4.5 DA 3.8	S.ID.6 S.ID.6b S.ID.7 S.ID.8 S.ID.9	Residual Least-squares line Line of best fit Linear regression Correlation coefficient	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention Challenge Activity
4-9 Slopes of Parallel and Perpendicular Lines	EA 5.8	G.GPE.5 F.IF.7	Parallel lines Perpendicular lines	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention 4-9 Graphing Calculator Lab Challenge Activity
4-10 Transforming Linear Functions	EA 5.2	F.BF.3	Family of functions Parent function Function notation Transformation	 Student Practice Quiz Practice B Worksheet

			Translation Rotation Reflection	Problem Solving Worksheet Skills Intervention Problem Solving Intervention 4-10 Graphing Calculator Lab Challenge Activity

Chapter 5: Systems of Equations and Inequalities
Timeline: 8 days

mmon Core Standards

A.REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.

A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

Textbook Correlations	2007 SC Standard	CCSS	Vocabulary	Resources/Examples
5-1 Solving Systems by Graphing	EA 4.9 EA 5.11	A.REI.6 A.REI.11 A.CED.2 A.CED.3	System of linear equations Solution of a system of linear equations	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
5-2 Solving Systems by Substitution	EA 4.10 EA 5.11	A.REI.6 A.CED.3		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
5-3 Solving Systems by Elimination	EA 4.10 EA 5.11	A.REI.5 A.REI.6 A.CED.3		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
5-4 Solving Special Systems	EA 4.9	A.REI.6	Consistent system	

	EA 4.10 EA 5.11	A.CED.2 A.CED.3	Inconsistent system Independent system Dependent system	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
5-5 Solving Linear Inequalities	EA 4.8 EA 5.12	A.REI.12 A.CED.3	Linear inequality Solution of a linear inequality	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
5-6 Solving Systems of Linear Inequalities	IA 2.2 IA 2.3	A.REI.12 A.CED.3	System of linear inequalities Solutions of a system of linear inequalities	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention

Chapter 6: Exponents and Polynomials
Timeline: 7 days

mmon Core Standards

N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define 51/3 to be the cube root of 5 because we want (51/3)3 = 5(1/3)3 to hold, so (51/3)3 must equal 5.

N.RN.2 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define 51/3 to be the cube root of 5 because we want (51/3)3 = 5(1/3)3 to hold, so (51/3)3 must equal 5.

A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients.

A.APR.1 Interpret parts of an expression, such as terms, factors, and coefficients.

Textbook Correlations	2007 SC Standard	CCSS	Vocabulary	Resources/Examples
6-1 Integer Exponents	EA 2.2 EA 2.7	N.RN.1	Quotient rule	
6-2 Rational Exponents	EA 2.2 EA 2.7 IA 4.5	N.RN.1 N.RN.2	Index	
6-3 Polynomials	EA 2.7	A.SSE.1a	Monomial Degree of a monomial Polynomial Degree of a polynomial Standard form of a polynomial Leading coefficient Quadratic Cubic Binomial Trinomial	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
6-4 Adding and Subtracting Polynomials	EA 2.7	A.APR.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
6-5 Multiplying Polynomials	EA 2.7	A.APR.1	Review properties of exponents	

				Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
6-6 Special Products of Binomials	EA 2.7	A.APR.1	Perfect-square trinomial Difference of two squares	 Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention

Chapter 7: Factoring Polynomials
Timeline: 7 days

mmon Core Standards

A.SSE.2 Interpret parts of an expression, such as terms, factors, and coefficients.

Textbook Correlations	2007 SC Standard	CCSS	Vocabulary	Resources/Examples
7-1 Factors and Greatest Common Factors		A.SSE.2	Prime factorization Greatest common factor	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
7-2 Factoring by GCF	EA 2.8	A.SSE.2		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
7-3 Factoring x^2+bx+c	EA 2.8	A.SSE.2	Guess and check	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
7-4 Factoring ax^2+bx+c	EA 2.8	A.SSE.2		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
7-5 Factoring Special Products	EA 2.8	A.SSE.2	Perfect-square trinomial Difference of squares	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
7-6 Choosing a Factoring Method	EA 2.8	A.SSE.2		SMART

				Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention

Chapter 8: Quadratic Functions and Equations
Timeline: 9 days

mmon Core Standards

A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

F.BF.1 Write a function that describes a relationship between two quantities.

F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

A.REI.4 Solve quadratic equations in one variable.

A.REI.4a Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)2 = q$ that has the same solutions Derive the quadratic formula from this form.

A.REI.4b Solve quadratic equations by inspection (e.g., for $x2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.

A.REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = –3x$ and the circle $x2 + y2 = 3$.

A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

Textbook Correlations	2007 SC Standard	CCSS	Vocabulary	Resources/Examples
8-1 Identifying Quadratic Functions	EA 6.1	F.IF.7 A.REI.10	Quadratic function Parabola Vertex Minimum Maximum	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
8-2 Characteristics of Quadratic Functions	EA 6.5	F.IF.7 F.IF.8 F.IF.4	Zero of a function Axis of symmetry	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
8-3 Graphing Quadratic Functions	EA 6.5	F.IF.7 F.IF.4 F.IF.8		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
8-4 Transforming Quadratic Functions	EA 6.1 EA 6.2 EA 3.5	F.BF.3 F.IF.7 F.IF.5		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
8-5 Solving Quadratic Equations by Graphing	EA 6.5	A.REI.11 A.REI.4 F.IF.7 F.IF.5	Quadratic equation Solve by graphing	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention

8-6 Solving Quadratic Equations by Factoring	EA 6.4	A.REI.4b A.SSE.3	Zero product property	 Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
8-7 Solving Quadratic Equations by Using Square Roots	EA 2.2	A.REI.4b A.CED.3 A.CED.1 F.BF.1	Square-root property	 Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
8-8 Completing the Square	IA 3.3	A.REI.4a A.CED.1	Completing the square	 Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
8-9 The Quadratic Formula and the Discriminant	IA 3.3	A.REI.4b A.REI.4a A.REI.1	Discriminant Types of roots	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
8-10 Nonlinear Systems	IA 2.11	A.REI.7	Nonlinear system of equations	 Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention

Chapter 10: Data Analysis and Probability
Timeline: 10 days

mmon Core Standards

S.ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).

S.ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

S.ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

S.IC.6 Evaluate reports based on data.

S.CP.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or", "and", "not").

S.CP.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

S.CP.3 Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.

S.CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer

S.CP.6 Find the conditional probability of A given B as the fraction of Bs outcomes that also belong to A, and interpret the answer in terms of the model.

Textbook Correlations	2007 SC Standard	CCSS	Vocabulary	Resources/Examples
10-1 Organizing and Displaying Data	DA 3.2 DA 3.3	S.ID.1	Bar graph Line graph Circle graph	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
10-2 Frequency and Histograms	DA 3.2 DA 3.3 DA 3.4	S.ID.1	Stem-and-leaf plot Frequency Frequency table Histogram Cumulative frequency	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention

10-3 Data Distributions	DA 3.2 DA 3.3 DA 4.4	S.ID.2 S.ID.3 S.ID.1	Mean Median Mode Range Outlier First quartile Third quartile Interquartile range Box-and-whisker plot	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
10-4 Misleading Graphs and Statistics	DA 1.7	S.IC.6	Random sample	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
10-5 Experimental Probability	DA 5.9	S.CP.1	Experiment Trail Outcome Sample space Event Probability Experimental probability Prediction	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
10-6 Theoretical Probability	DA 5.9	S.CP.1	Equally likely Theoretical probability Fair Complement Odds	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
10-7 Independent and Dependent Events	DA 5.3 DA 5.7	S.CP.2 S.CP.6 S.CP.3 S.CP.5 S.CP.1	Independent events Dependent events	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention

Chapter 9: Exponential Functions
Timeline: 7 days

mmon Core Standards

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n + 1) = f(n) + f(n - 1)$ for $n \geq 1$.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

F.IF.7e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.

F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.

F.BF.1 Write a function that describes a relationship between two quantities.

F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

Textbook Correlations	2007 SC Standard	CCSS	Vocabulary	Resources/Examples
9-1 Geometric Sequences	IA 6.1 IA 6.2	F.IF.3 F.LE.2 F.BF.2	Geometric sequence Common ratio	 Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
9-2 Exponential Functions	IA 4.14	F.IF.7e F.LE.1 F.IF.4 F.IF.8 A.REI.10	Exponential functions	 Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
9-3 Exponential Growth and Decay	IA 4.4	F.LE.2 F.LE.5 F.LE.1 F.BF.1	Exponential growth Compound interest Exponential decay Half-life	 Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
9-4 Linear, Quadratic, and Exponential Models	IA 4.4	F.LE.1 F.LE.2 A.CED.2 F.IF.4 F.IF.7 F.BF.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
9-5 Comparing Functions		F.IF.9 F.IF.6 F.LE.3	Average rate of change	 Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention

Depth of Thinking (Webb) + Type of Thinking (Revised Bloom, 2001)	DOK Level 1 Recall & Reproduction	DOK Level 2 Basic Skills & Concepts	DOK Level 3 Strategic Thinking & Reasoning	DOK Level 4 Extended Thinking
Remember	- Recall, locate basic facts, definitions, details, events			
Understand	- Select appropriate words for use when intended meaning is clearly evident	- Specify, explain relationships - summarize – identify central ideas	- Explain, generalize, or connect ideas using supporting evidence (quote, text evidence, example…)	- Explain how concepts or ideas specifically relate to other content domains or concepts
Apply	- Use language structure (pre/suffix) or word relationships (synonym/antonym) to determine meaning	– Use context to identify word meanings - Obtain and interpret information using text features	- Use concepts to solve non-routine problems	- Devise an approach among many alternatives to research a novel problem
Analyze	- Identify the kind of information contained in a graphic, table, visual, etc.	– Compare literary elements, facts, terms, events – Analyze format, organization, & text structures	- Analyze or interpret author's craft (e.g., literary devices, viewpoint, or potential bias) to critique a text	– Analyze multiple sources or texts - Analyze complex/ abstract themes
Evaluate			– Cite evidence and develop a logical argument for conjectures based on one text or problem	- Evaluate relevancy, accuracy, & completeness of information across texts/ sources
Create	- Brainstorm ideas, concepts, problems, or perspectives related to a topic or concept	-Generate conjectures or hypotheses based on observations or prior knowledge and experience	-Develop a complex model for a given situation -Develop an alternative solution	-Synthesize information across multiple sources or texts -Articulate a new voice, alternate theme, new knowledge or perspective

Chapter 1: Foundations for Functions
Timeline: 5 days

Common Core Standards

F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
1-1 Exploring Transformations	F.BF.3 F.IF.5	Transformation Translation – (visual aid) Reflection – (visual aid) Stretch Compression	http://media.mivu.org/mvu_pd/a4a/resources/translations/a001_practice.html http://www.cpm.org/pdfs/stuRes/GC/chapter_01/GC_Ch1_GO.pdf Transformations Powerpoint http://education.ti.com/downloads/demo/TransGraphx.pdf http://www.regentsprep.org/Regents/math/algtrig/ATP9/funclesson1.htm
1-2 Introduction to Parent Functions	F.BF.3 A.CED.2 A.CED.3 F.IF.5	Parent function	http://faculty.gg.uwyo.edu/dueker/GeophysicsClass/Math%20Review/IG%20parent%20functons.pdf
1-3Transforming Linear Functions	F.BF.3 A.CED.2 A.CED.3		http://my.hrw.com/math06_07/nsmedia/lesson_videos/alg1/player.html?contentSrc=6350/6350.xml http://www.cet.ac.il/math/function/english/line/transformations/index.htm
1-4 Curve Fitting with Linear Models	A.CED.3 A.CED.2	Regression Correlation	http://illuminations.nctm.org/LessonDetail.aspx?ID=L454

		Line of best fit Correlation coefficient	http://mste.illinois.edu/patel/amar430/keyprob1.html

Chapter 2: Quadratic Functions
Timeline: 10 days

Common Core Standards

F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

F.IF.7a Graph linear and quadratic functions and show intercepts, maxima, and minima.

F.IF.8a Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.

N.CN.1 Know there is a complex number i such that $i^2 = -1$, and every complex number has the form a + bi with a and b real numbers.

N.CN.2 Use the relation i2 = -1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

N.CN.7 Solve quadratic equations with real coefficients that have complex solutions.

A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
2-1 Using Transformations to Graph Quadratic Functions	F.BF.3 A.CED.2 A.CED.3	Quadratic function Parabola Vertex of a parabola Vertex form	http://www.mathsisfun.com/algebra/quadratic-equation-graph.html Quadratics: Vertex Form and Factored Form (Lab) 61 Cooperative Learning Activities Activity 50,51 (Comp/Lab) Exploring Conic Sections with Geometer's Sketchpad pg. 33-45

			Graph Transformation Practice Graph Transformation Discovery
2-2 Properties of Quadratic Functions in Standard Form	F.IF.7a A.CED.3 F.IF.5 F.IF.8a	Axis of symmetry Standard form Minimum value Maximum value	How high will it bounce? TI Activity (Calc) Real World Math with CBL System for TI-83 Activity 8,9 (Lab) 61 Cooperative Learning Activities for Alg. 1 Activity 47,48
2-3 Solving Quadratic Equations by Graphing and Factoring	F.IF.8a A.CED.1 F.IF.7a A.REI.11	Zero of a function Root of an equation Binomial Trinomial	Review factoring methods: GCF, Difference of Squares, Guess and Check BounceBack.gsp Vertical Team (open box) Water Fountain and the ParabolaSolving Quadratic Equations
2-4 Completing the Square	F.IF.8a A.CED.1	Completing the square	Sliding the roots of quadratics (Calc) Discovering Algebra Vol. 2 Lesson 10.9 Completing the Square Completing the Square Video Analyzing Graphs of Quadratic Functions Complex Roots of Parabola
2-5 Complex Numbers and Roots	N.CN.1 N.CN.2 N.CN.7 A.CED.1	Imaginary unit Imaginary number Complex number Real part Imaginary part Complex conjugate	Complex Numbers (Calc) Exploring Advanced Algebra with TI-83 pg. 40-43 Sketchpad Sketches Algebra II

			Graph of 3D or Complex Numbers
2-6 The Quadratic Formula	N.CN.7 A.CED.1	Discriminant	Discriminant Quadratic Formula Video Quadratic Formula Video
2-7 Solving Quadratic Inequalities	A.CED.1 A.CED.3	Quadratic inequality in two variables Critical values	http://www.regentsprep.org/Regents/math/algtrig/ATE6/Quadinequal.htm
2-8 Curve Fitting with Quadratic Models	A.CED.1 A.CED.2 A.CED.3	Quadratic model Quadratic regression	http://www.wmich.edu/cpmp/1st/unitsamples/pdfs/C2U4_265-273.pdf http://www.khanacademy.org/math/algebra/ck12-algebra-1/v/quadratic-regression
2-9 Operations with Complex Numbers	N.CN.2	Complex plane Absolute value of a complex number	Complex Numbers (Calc) Exploring Advanced Algebra with TI-83 pg. 40-43 Sketchpad Sketches Algebra II Graph of 3D or Complex Numbers

Chapter 3: Polynomial Functions
Timeline: 8 days

Common Core Standards

F.IF.7c Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

A.APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

A.APR.2 Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).

A.APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

A.APR.4 Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity $(x^2 + y^2)^2 = (x^2 – y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.

A.APR.5 (+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.

A.APR.6 Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.

A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

A.SSE.2 Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 – y^4$ as $(x^2)^2 – (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 – y^2)(x^2 + y^2)$.

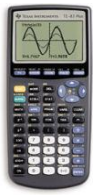
A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

N.CN.9 (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.

N.CN.7 Solve quadratic equations with real coefficients that have complex solutions.

N.CN.8 (+) Extend polynomial identities to the complex numbers. For example, rewrite $x^2 + 4$ as $(x + 2i)(x – 2i)$.

F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
3-1 Polynomials	F.IF.7c A.APR.1 A.CED.2 A.CED.3	Monomial Polynomial Degree of a monomial Degree of a polynomial Leading coefficient Binomial Trinomial Polynomial function	www.brightstorm.com/math/ (Lab) Cooperative Learning and Mathematics pg. 28 (Lab) Cooperative Learning and Mathematics pg. 29 Example: Simplify: $(5x^2-3x)-(-6x^2+2x-7)$ $(3x^4y^6)(-8x^3y)^2$ $(4x^4-x^3-19x^2+11x-2)\div(x-2)$
3-2 Multiplying Polynomials	A.APR.5 (+) A.APR.1 A.APR.4	Distributive property	Review properties of rational exponents (p.360) www.brightstorm.com/math/
3-3 Dividing Polynomials	A.APR.2 A.APR.6	Synthetic division	http://www.brightstorm.com/math/algebra-2/polynomials/using-synthetic-division-to-evaluate-polynomials/
3-4 Factoring Polynomials	A.APR.2 A.SSE.2 A.APR.3 A.APR.4	Factor by grouping Sum and difference of cubes Factor theorem	Review factoring methods: GCF, Difference of Squares, Guess and Check Example: Use the remainder and factor theorems to show that $x+2$ is a factor of x^3-2x^2-5x+6, then find any remaining factors.  Difference of Squares More Factoring (Comp) Exploring Algebra with Geometer's Sketchpad pg. 29,30

			 Multiply Polynomials Factoring a^2-b^2
3-5 Finding Real Roots of Polynomial Equations	A.APR.3 A.CED.1 A.REI.11	Multiplicity Rational and irrational root theorem	http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=8&ved=0CGcQFjAH&url=http%3A%2F%2Fwww.solonschools.org%2Faccounts%2FCKamkutis%2FFindingZeroesofPolynomials_9292008103100.ppt&ei=SJDoT4HCJIL30gGf7LHuCQ&usg=AFQjCNGQifi-_xYHejHA3qX_M03gjdVJoA
3-6 Fundamental Theorem of Algebra	N.CN.9 (+) N.CN.7 N.CN.8 (+) A.APR.2 A.CED.1 A.REI.11	Complex conjugate root theorem	http://my.hrw.com/math06_07/nsmedia/homework_help/alg2/alg2_ch06_06_homeworkhelp.html http://www.youtube.com/watch?v=QKibsVu0DmA&feature=related
3-7 Investigating Graphs of Polynomial Functions	A.APR.3 F.IF.7c A.CED.2 A.CED.3	End behavior Turning point Local maximum Local minimum	http://my.hrw.com/math06_07/nsmedia/lesson_videos/alg2/player.html?contentSrc=6457/6457.xml http://my.hrw.com/math06_07/nsmedia/homework_help/alg2/alg2_ch06_07_homeworkhelp.html
3-8 Transforming Polynomial Functions	F.IF.7c F.BF.3 A.CED.2 A.CED.3	Vertical/Horizontal translation Vertical/Horizontal stretch Vertical/Horizontal compression Reflection – (visual aid)	http://www.regentsprep.org/Regents/math/algtrig/ATP9/funclesson1.htm
3-9 Curve Fitting with Polynomial Models	A.CED.3 F.IF.7c A.CED.2	Finite differences of polynomials	http://www.keymath.com/documents/daa2/CL/DAA2CL010_07.pdf

Chapter 4: Exponential and Logarithmic Functions
Timeline: 8 days

Common Core Standards

F.IF.7e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

A.SSE.1 Interpret expressions that represent a quantity in terms of its context (Modeling standard).

A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

F.BF.4c (+) Read values of an inverse function from a graph or a table, given that the function has an inverse.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*

F.BF.5 (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

F.BF.4 Find the inverse of functions.

F.LE.4 For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where ab, b, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.

A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

F.LE.7e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

Textbook Correlations	Standard	Vocabulary	Resources/Examples

4-1 Exponential Functions, Growth and Decay	F.IF.7e A.SSE.1 A.CED.2 A.CED.3	Exponential function Base Asymptote Exponential growth Exponential decay	Exponential Functions Paying College Tuition from USA Today and TI Specialty Functions GSP Graphing Exponential Functions Exploring Functions with TI-83 pg. 37 (Comp) Web Quest Projects Unit 3 (Glencoe website) www.explorelearning.com Dye Elimination Activity - Gizmos **Nevada's Population** Activity for TI84 . Data Activities: Modeling Algebraic Functions with Datra Collection Activities by Marilyn J. Parker (ISBN # 1-886309-74-4)
4-2 Inverses of Relations and Functions	F.BF.4c (+) F.IF.5 A.CED.2 A.CED.3	Inverse relation Inverse function	Functions and Inverses Inverse Functions  Inverse Functions Sketchpad Sketches Algebra II Exploration 9 pg. 9 P*recalculus and Trig Explorations*, Paul Foerster
4-3 Logarithmic Functions	F.BF.5(+) F.IF.7e A.CED.2 A.CED.3	Logarithm Common logarithm Logarithmic function	(Calc) Exploring Functions with the TI-83 pg. 40-43 www.explorelearning.com Logarithmic Functions Activity A - Gizmos Logarithmic Functions Activity B - Gizmos
4-4 Properties of Logarithms	A.CED.2 A.CED.3 F.IF.7 F.BF.4	Product property Quotient property Power property Inverse property Change of base formula	Review properties of rational exponents (p.360) Activity 17 pg. 31-32 *Graphing Calculator Activities* by Lund/Andersen http://www.brightstorm.com/math/algebra-2/inverse-exponential-and-logarithmic-functions/change-of-base-formula/

4-5 Exponential and Logarithmic Equations and Inequalities	F.LE.4 A.CED.1 A.REI.11	Exponential equation Logarithmic equation	Solving Exp and Log Equations
4-6 The Natural Base, *e*	F.LE.4 F.IF.7e A.CED.2 A.CED.3 F.IF.5	Natural logarithm Natural logarithmic function	http://www.brightstorm.com/math/algebra-2/inverse-exponential-and-logarithmic-functions/common-and-natural-logarithms/
4-7 Transforming Exponential and Logarithmic Functions	F.BF.3 A.CED.2 A.CED.3 F.IF.5	Vertical/Horizontal translation Vertical/Horizontal stretch Vertical/Horizontal Compression Reflection – (visual aid)	www.brightstorm.com
4-8 Curve Fitting with Exponential and Logarithmic Models	A.CED.3 A.CED.2	Exponential regression Logarithmic regression	http://www.youtube.com/watch?v=YCRgsUSotEY *http://www.youtube.com/watch?v=TkMQ5n6vWGg&feature=relmfu*

Chapter 5: Rational and Radical Functions
Timeline: 8 days

Common Core Standards

A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

A.APR.7 (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

F.IF.7b Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

F.BF.1b Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.

F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
5-1 Variation Functions	A.CED.2 A.CED.3	Direct variation Constant of variation Joint variation Inverse variation Combined variation	http://www.cpm.org/pdfs/state_supplements/Direct_and_Inverse_Variation.pdf http://teachers.henrico.k12.va.us/math/hcpsalgebra2/9-2.htm

5-2 Multiplying and Dividing Rational Expressions	A.APR.7	Rational expression	(Lab) Cooperative Learning & Mathematics pg. 33-36,284
5-3 Adding and Subtracting Rational Expressions	A.APR.7	Complex fraction LCM of polynomials	(Calc) Discovering Algebra Vol. 2 pg. 21-27
5-4 Rational Functions	A.CED.2 A.CED.3	Rational function Discontinuous function Continuous function Hole (in a graph) Horizontal/Vertical asymptotes	http://www.khanacademy.org/math/algebra/ck12-algebra-1/v/asymptotes-of-rational-functions http://www.brightstorm.com/math/precalculus/polynomial-and-rational-functions/graphing-rational-functions-n-less-than-m/
5-5 Solving Rational Equations and Inequalities	F.IF.5	Rational equation Extraneous solution Rational inequality	(Calc) Activities for Algebra with the TI-83 Plus Activity 14 (Calc) Discovering Algebra Vol. 2 Lesson 9.6
5-6 Radical Expressions and Rational Exponents	A.REI.12	Index Rational exponent	Review properties of rational exponents (p.360) Rational Exponents Notes & Examples
5-7 Radical Functions	F.IF.7b F.BF.3 F.IF.5 A.CED.2 A.CED.3	Radical function Square-root function	http://www.mathwarehouse.com/geometry/parabola/square-root-function.php
5-8 Solving Radical Equations and Inequalities	A.CED.1	Radical equation Radical inequality Extraneous solutions	Solving Radical Equations More Solving Radical Equations (Calc) Skill & Practice Masters in Algebra Using TI-83 pg. 21,22

Chapter 6: Functions and Their Graphs
Timeline: 8 days

Common Core Standards

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F.BF.1b Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
6-1 Multiple Representations of Functions	F.IF.7		
6-2 Comparing Functions	F.IF.9		
6-3 Piecewise Functions	A.CED.2 A.CED.3	Piecewise function Step function	http://www.pctm.org/magazine/PiecewiseFunctions_Storm.pdf http://mathdemos.org/mathdemos/piecewise/piecewise_continuity.html Building a Step Function
6-4 Transforming Functions	F.BF.3 A.CED.2 A.CED.3	Vertical/Horizontal translation Vertical/Horizontal Stretch Vertical/Horizontal Compression Reflection – (visual aid)	www.brightstorm.com
6-5 Operations with Functions	F.BF.1b A.CED.2 A.CED.3	Composition of functions	Composite Functions http://www.youtube.com/watch?v=S4AEZElTPDo

6-6 Functions and Their Inverses	F.BF.1b A.CED.2 A.CED.3	One-to-one function	Functions and Inverses Inverse Functions  Inverse Functions Sketchpad Sketches Algebra II Exploration 9 pg. 9 P*recalculus and Trig Explorations*, Paul Foerster
6-7 Modeling Real-World Data	A.CED.3 A.CED.2	Families of functions	Specialty Functions (Sketchpad) Futures Channel Body Mechanic Rational Expressions and Functions Video; Download Teacher Guide and Student Activity

Chapter 9: Sequences and Series
Timeline: 6 days

Common Core Standards

F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n + 1) = f(n) + f(n - 1)$ for $n \geq 1$.

F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

F.BF.1a Determine an explicit expression, a recursive process, or steps for calculation from a context.

F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

A.SSE.4 Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
9-1 Introduction to Sequence	F.IF.3 F.BF.2	Sequence Term of a sequence Infinite sequence Finite sequence Recursive formula Explicit formula Iteration	Spreadsheet Investigation, textbook pg. 605 Algebra Activity: Special Sequences, textbook pg. 607 Algebra Activity: Fractals, textbook pg. 611 Recursive Sequences
9-2 Series and Summation Notation	F.IF.3 F.BF.1a	Series Partial sum Summation notation	Graphing Calculator Investigation, textbook pg. 585 Sigma Notation Sigma Notation and Series
9-3 Arithmetic Sequences and Series	F.BF.2 F.IE.2	Arithmetic sequence Arithmetic series	http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=340 Arithmetic and Geometric Sequences - Gizmos
9-4 Geometric Sequences and Series	A.SSE.4 F.BF.2 F.LE.2	Geometric sequence Geometric mean Geometric series	Arithmetic and Geometric Sequences - Gizmos Mathlets: Sequences and Series

9-5 Mathematical Induction and Infinite Geometric Series	F.BF.2	Infinite geometric series Converge Limit Diverge Mathematical induction	NCTM Illuminations LIMITS Limits (Geometric Series) Zeno's Paradox pg. 14 *Exploring Advanced Algebra with the TI83*, Brendan Kelly

Chapter 12: Conic Sections
Timeline: 7 days

Common Core Standards

G.GPE.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

G.GPE.2 (+) Derive the equation of a parabola given a focus and directrix.

G.GPE.3 (+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.

G.GPE.4 Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point (0, 2).

A.REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
12-1 Introduction to Conic Sections **(OMIT or teach after 12-5)**	G.GPE.4	Conic sections	Using a calculator to graph
12-2 Circles	G.GPE.1	Circle Tangent	Interactive Circles (Comp) Web Quest Projects Unit 3 (Glencoe website)  GeoGebra Dynamic Worksheets 2008  Conics Interesting Properties  Conics Defs & Graphs
12-3 Ellipses	G.GPE.3+	Ellipse Focus of an ellipse Major axis Vertices of an ellipse Minor axis Co-vertices of an ellipse	Textbook Lab 12-3 p. 837 Constructing an Ellipse (Calc) Exploring Functions with TI-83 pg. 52 (Comp/Lab) Exploring Conic Sections with Geometer's Sketchpad pg. 5-29 GeoGebra: Ellipse Definitiion

			Ellipses: Major / Minor Axis of an ellipse
12-4 Hyperbolas	G.GPE.3+	Hyperbola Focus of a hyperbola Branch of a hyperbola Transverse axis Vertices of a hyperbola Conjugate axis Co-vertices of a hyperbola	http://www.explorelearning.com Hyperbola Activity A Constructing a hyperbola (Calc) Exploring Functions with TI-83 pg. 56 (Comp/Lab) Exploring Conic Sections with Geometer's Sketchpad pg. 52-56  GeoGebra: Hyperbola Definition
12-5 Parabolas	G.GPE.2+	Focus of a parabola Directrix	Graphing Conic Sections http://exchange.smarttech.com/search.html?q=parabolas&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US#page=3
12-6 Identifying Conic Sections	G.GPE.1	Standard form for conic sections	A Helping Hand "Conic Picture Project" pg. 13-16 Conic Sections (Java)
12-7 Solving Nonlinear Systems	A.REI.7	Nonlinear system of equations	Review solving systems by graphing, substitution, and elimination. Example: Solve the system of equations: $y + 20 = x^2$ $y + x = 0$

Chapter 7: Probability
Timeline: 6 days

Common Core Standards

S.CP.9 (+) Use permutations and combinations to compute probabilities of compound events and solve problems.

S.CP.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or", "and", "not").

S.MD.7 (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

S.CP.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or", "and", "not").

S.CP.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

S.CP.3 Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.

S.CP.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.

S.CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.

S.CP.6 Find the conditional probability of A given B as the fraction of Bs outcomes that also belong to A, and interpret the answer in terms of the model.

S.CP.7 Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.

S.IC.2 Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?

S.ID.5 Summarize categorical data for two categories in two-way frequency tables, Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

S.CP.8 (+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
7-1 Permutations and Combinations	S.CP.9+ S.CP.1	Fundamental Counting Principle Permutation Factorial combination	Probability Permutations, Combinations, Probability

			TI Activity More Probability The Geometer's Sketchpad Statistic Collection Fathom Resource Center • Data & Simulations • Activities • Student Projects • Demonstrations • AP Statistics Link Fathom 2.0 free for 60 Days • http://www.regentsprep.org/regents/math/algebra/APR1/indexAPR1.htm • http://www.algebra-class.com/fundamental-counting-principle.html • http://tamathawis.weebly.com/uploads/8/0/5/3/8053076/6.1_-_fundamental_counting_principle.pdf • 1. Factorials • 2. Permutations • http://education.ti.com/calculators/timath/US/Activities/Detail?sa=1010&id=10076 • http://education.ti.com/calculators/timath/US/Activities/Detail?sa=1010&id=12601 3. Combinations • http://education.ti.com/calculators/timath/US/Activities/Detail?sa=1010&id=12601 • http://education.ti.com/calculators/timath/US/Activities/Det

			ail?sa=1010&id=10126
7-2 Theoretical and Experimental Probability	S.MD.7+ S.CP.9+	Probability Outcome Sample space Event Equally likely outcomes Favorable outcomes Theoretical probability Complement Geometric probability Experiment Trial Experimental probability	1. Theoretical Probability • http://www.algebra-class.com/theoretical-probability.html 2. Complement • 3. Geometric Probability • http://www.algebra-class.com/geometric-probability.html 4. Experimental Probability • http://www.algebra-class.com/theoretical-probability.html http://education.ti.com/xchange/US/Math/Statistics/12101/Stat_GeoDistr_worksheet_TI84.pdf
7-3 Independent and Dependent Events	S.CP.3 S.CP.2 S.CP.4 S.CP.6 S.IC.2 S.ID.5 S.CP.8+	Independent events Dependent events Conditional probability	1. Independent Events • http://www.algebra-class.com/probability-problems.html • 2. Conditional Probability • 3. Dependent Events • http://www.algebra-class.com/probability-help.html
7-4 Two-Way Tables	S.ID.5 S.CP.4 S.CP.5	Joint relative frequency Marginal relative frequency Frequency Conditional relative frequency	http://education.ti.com/xchange/US/Math/Statistics/11582/Stat_TwoWay_worksheet_TI84.pdf
7-5 Compound Events	S.CP.9+ S.CP.1 S.CP.7	Simple event Compound event Mutually exclusive events	1. Mutually Exclusive Events • http://www.algebra-class.com/probability-

		Inclusive events	lessons.html 2. Inclusive • http://www.algebra-class.com/probability-lessons.html

Chapter 8: Data Analysis and Statistics
Timeline: 8 days

Common Core Standards

S.ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).

S.ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

S.ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

S.ID.4 Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

S.IC.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population.

S.IC.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

S.IC.4 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.

S.IC.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between two parameters are significant.

S.IC.6 Evaluate reports based on data.

S.MD.4 (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?

S.MD.5 (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.

S.MD.6 (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).

S.MD.7 (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

A.APR.6 Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
8-1 Measures of Central Tendency and Variation	S.ID.2 S.ID.1 S.ID.3 S.MD.5	Expected value Probability distribution Variance Standard deviation	Mean, Median, Mode, Range

		Outlier Box-and-whisker plot Interquartile range	Data"Live" Data Links Practice (Learning Check) HSAP practice with TI Navigator http://education.ti.com/xchange/US/Math/AlgebraI/8200/BoxPlotHist_Student.pdf
8-2 Data Gathering	S.IC.1 S.MD.6(+) S.MD.7(+)	Population Census Sample Random sample Biased sample Statistic parameter	Sampling and Experimenting http://exchange.smarttech.com/search.html?q=observational+study+&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US
8-3 Surveys, Experiments, and Observational Studies	S.IC.3	Experiment Observational study Controlled experiment Control group Treatment group Randomized comparative experiment	Sampling and Experimenting http://exchange.smarttech.com/search.html?q=observational+study+&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US
8-4 Significance of Experimental Results	S.IC.5	Hypothesis testing Null hypothesis	Textbook multi-step test prep p. 576 http://education.ti.com/calculators/timath/US/Activities/Detail?sa=5026&id=12728
8-5 Sampling Distributions	S.IC.4 S.IC.6	Simple random sample Systematic sample Stratified sample Cluster sample Convenience sample Self-selected sample Probability sample Margin of error	http://education.ti.com/xchange/US/Math/Statistics/9852/Sampling_Student.pdf
8-6 Binomial Distributions	A.APR.6 S.MD.4(+)	Binomial Theorem Binomial experiment Binomial probability	The Binomial Theorem http://education.ti.com/calculators/timath/US/Activities/Detail?sa=1010&id=10253 http://education.ti.com/calculators/timath/US/Activities/Det

			ail?sa=1010&id=10234 http://education.ti.com/calculators/timath/US/Activities/Detail?sa=5026&id=11936 http://education.ti.com/calculators/timath/US/Activities/Detail?sa=5026&id=9415
8-7 Fitting to a Normal Distribution	S.ID.4	Standard normal value	http://education.ti.com/calculators/timath/US/Activities/Detail?sa=1010&id=10279
8-8 Analyzing Decisions	S.MD.5 S.MD.7+	Expected value	

Chapter 10: Trigonometric Functions
Timeline: 6 days

Common Core Standards

F.TF.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle

F.TF.2 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.

F.TF.3 (+) Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for $\pi-x$, $\pi+x$, and $2\pi-x$ in terms of their values for x, where x is any real number

F.TF.4 (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.

F.TF.5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.

F.TF.6 (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.

F.TF.7 (+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.

G.SRT.10 (+) Prove the Laws of Sines and Cosines and use them to solve problems.

G.SRT.11 (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).

Textbook Correlations	Standard	Vocabulary	Resources/Examples
10-1 Right-Angle Trigonometry	F.TF.3 F.TF.5	Trigonometric function Sine Cosine Tangent Cosecant Secant Cotangent Special right triangles Angle of depression Angle of elevation	http://www.thefutureschannel.com/hands-on_math/triangular_toys.php Right Triangles and Trig Ratios Example: Solve right triangle ABC. Round measures of sides to the nearest tenth and measures of angles to the nearest degree. Trig Rap-Gettin Triggy with it. http://www.youtube.com/watch?v=t2uPYYLH4Zo
10-2 Angles of Rotation	F.TF.2	Standard position Initial side Terminal side Angle of rotation Coterminal angle Reference angle	Exploration 12 pg 13 P*recalculus and Trig Explorations*, Paul Foerster Exploration 17-18 pg 18-19 P*recalculus and Trig Explorations*, Paul Foerster  Trigonometry  Vertical Team (kite)

			 Vertical Team (clock)
10-3 The Unit Circle	F.TF.2 F.TF.1 F.TF.4	Radian Unit circle Degrees to radians Radians to degrees Evaluate trigonometric functions	Rewrite the degree measure in radians and the radian measure in degrees a. 240^0 b. $\frac{\pi}{12}$ Example: Find the exact value of all six trigonometric functions of 150^0.
10-4 Inverses of Trigonometric Functions	F.TF.6+ F.TF.7+	Inverse sine function (arcsin) Inverse cosine function (arccos) Inverse tangent function (arctan)	Investigating Activity text P578 http://www.brightstorm.com/math/precalculus/advanced-trigonometry/the-inverse-cosine-function/#
10-5 The Law of Sines	G.SRT.10+ G.SRT.11+	Area of a triangle Ambiguous cases	Example: Find the area of triangle ABC to the nearest tenth given: $a = 5$ c=6 and $\measuredangle$B=112^0 Example: In triangle ABC, $A = 118^0, a = 20,$ and $b = 17$. Solve for triangle ABC Round measures of sides to the nearest tenth and measures of angles to the nearest degree in DMS format.
10-6 The Law of Cosines	G.SRT.10+ G.SRT.11.+	Heron's formula	Law of Cosines  Vertical Team (ladder)  Vertical Team (open box)  What if (Cycloids, Sq Wheels, Ferris Example: (word problem) A medical rescue helicopter has flown from its home base a point C to pick up an accident victim at point B and then from there to the hospital at point A. The pilot needs to know how far he is now from his home base so he can decide whether to refuel before returning. How far is the

			hospital from the helicopter's base?

Chapter 11: Trigonometric Graphs and Identities
Timeline: 5 days

Common Core Standards

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

F.TF.5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.

F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
11-1 Graphs of Sine and Cosine	F.IF.7 F.TF.5 F.BF.3 F.IF.5 A.CED.2 A.CED.3	Transformations of sine and cosine graphs Periodic function Cycle Period Amplitude Frequency Phase shift	 Trigonometric Functions-Graphical Visualization. Trigonometric Functions Math Bits GSP
11-2 Graphs of Other Trigonometric Functions	F.TF.5 F.IF.5 F.IF.7 F.BF.3 A.CED.2 A.CED.3	Transformations of tangent and cotangent graphs	http://exchange.smarttech.com/search.html?q=trigonometric+translations&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US
11-3 Fundamental Trigonometric Identities	F.TF.8	Reciprocal identities Tangent and cotangent ratio identities Pythagorean identities Negative-angle identities	http://mathbits.com/MathBits/TISection/trig/trigidentity.htm http://exchange.smarttech.com/search.html?q=trigonometric+identity&subject=Mathematics&grade=G

			rade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US
11-4 Sum and Difference Identities	F.TF.9+	Evaluating expressions Proving identities with sum and difference identities Rotation transformation	http://www.regentsprep.org/Regents/math/algtrig/ATT14/formulalesson.htm
11-5 Double-Angle and Half-Angle Identities	F.TF.9+	Evaluating expressions Proving identities	http://exchange.smarttech.com/search.html?q=double+half+angle&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US
11-6 Solving Trigonometric Equations	F.TF.7+	Infinitely many solutions Quadratic form Trigonometric identities	http://earthmath.kennesaw.edu/main_site/review_topics/trig_equations.htm http://www.regentsprep.org/Regents/math/algtrig/ATT10/trigequations2.htm

Chapters 1-6 require 47 days **Chapters 9,12,7,8,10,11 require 38 days**

Textbook Correlations	**Standard**	**Vocabulary**	**Resources/Examples**

S

Chapter 1: Quadratic Functions and Factoring
Timeline: 9 days

Common Core Standards

A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

A.REI.4a Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)2 = q$ that has the same solutions Derive the quadratic formula from this form.

A.REI.4b Solve quadratic equations by inspection (e.g., for $x2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.

A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

A.SSE.1 Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)_n$ as the product of P and a factor not depending on P.

A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients.

A.SSE.3a Factor a quadratic expression to reveal the zeros of the function it defines.

A.SSE.3b Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

F.IF.7a Graph linear and quadratic functions and show intercepts, maxima, and minima.

F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

F.IF.8a Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.

N.CN.1 Know there is a complex number i such that $i^2 = -1$, and every complex number has the form a + bi with a and b real numbers.

N.CN.2 Use the relation $i_2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

N.CN.3 (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.

N.CN.4 (+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.

N.CN.7 Solve quadratic equations with real coefficients that have complex solutions.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
1-1 Graph Quadratic Functions in Standard Form	F.IF.7a A.CED.1 A.REI.10 F.IF.4	Quadratic function Parabola Vertex Axis of symmetry Minimum value Maximum value	http://www.mathsisfun.com/algebra/quadratic-equation-graph.html Quadratics: Vertex Form and Factored Form (Lab) 61 Cooperative Learning Activities Activity 50,51 (Comp/Lab) Exploring Conic Sections with Geometer's Sketchpad pg. 33-45
1-2 Graph Quadratic Functions in Vertex or Intercept Form	F.IF.7a A.SSE.3a F.IF.4 F.BF.3	Vertex form Intercept form	Review FOIL method How high will it bounce? TI Activity (Calc) Real World Math with CBL System for TI-83 Activity 8,9 (Lab) 61 Cooperative Learning Activities for Alg. 1 Activity 47,48  BounceBack.gsp  Vertical Team (open box)

			 Water Fountain and the Parabola
1-3 Solve $x^2+bx+c=0$ by Factoring	A.SSE.3a A.CED.1 F.IF.8	Monomial Binomial Trinomial Quadratic equation Root of an equation Zero of a function	Methods of factoring Difference of Squares Guess and Check Perfect Square Trinomials Zero Product Property Solving Quadratic Equations
1-4 $ax^2+bx+c=0$ by Factoring	A.SSE.3a A.SSE.1 A.CED.1 F.IF.8	monomial	Methods of factoring GCF Difference of Squares Perfect Square Trinomials www.brightstorm.com
1-5 Solve Quadratic Equations by Finding Square Roots	A.REI.4b A.REI.1 A.REI.10 F.IF.4	Square root Radical Radicand Rationalizing the denominator Conjugates	Solving Radical Equations More Solving Radical Equations
1-6 Perform Operations with Complex Numbers	N.CN.2 N.CN.1 N.CN.3 N.CN.4 N.CN.7	Imaginary unit *i* Complex number Imaginary number Complex conjugates Complex plane Absolute value of a complex number	Sums & Differences of Complex Numbers Complex Numbers (Calc) Exploring Advanced Algebra with TI-83 pg. 40-43 Sketchpad Sketches Algebra II  Graph of 3D or Complex Numbers
1-7 Complete the Square	A.REI.4a N.CN.7 A.SSE.1a A.SSE.3b A.REI.4b F.IF.8a	Completing the square	 Completing the Square Completing the Square Video  Analyzing Graphs of Quadratic Functions  Complex Roots of Parabola

1-8 Use the Quadratic Formula and the Discriminant	N.CN.7 A.REI.4a A.REI.4b F.IF.4 F.IF.5	Quadratic formula Discriminant	Use Quadratic Formula to solve equations Discriminant Quadratic Formula Video Quadratic Formula Video
1-9 Graph and Solve Quadratic Inequalities	A.REI.4b A.SSE.3a A.CED.1 A.CED.3 F.IF.4 F.IF.5	Quadratic inequality in two variables quadratic inequality in one variable	http://www.classzone.com/books/algebra_2/pdfs/2_05_7ec.pdf http://www.classzone.com/cz/books/algebra_2_2007_na/secured/resources/applications/ebook/resources/assets/dswmedia/9_7_GraphQuadInEq.html http://www.pearsonsuccessnet.com/ebook/workbooks/0-13-037881-X/0-13-063395-X/A20303PR.pdf

Chapter 2: Polynomials and Polynomial Functions
Timeline: 8 days

Common Core Standards

A.APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

A.APR.2 Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).

A.APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

A.APR.4 Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity $(x^2 + y^2)^2 = (x^2 – y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.

A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.SSE.2 Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 – y^4$ as $(x^2)^2 – (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 – y^2)(x^2 + y^2)$.

A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

F.BF.1 Write a function that describes a relationship between two quantities.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

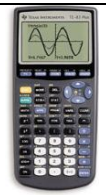
F.IF.7c Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

N.CN.7 Solve quadratic equations with real coefficients that have complex solutions.

N.CN.9 (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.

N.CN.8 (+) Extend polynomial identities to the complex numbers. For example, rewrite $x^2 + 4$ as $(x + 2i)(x – 2i)$.

N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
2-1 Use Properties of Exponents	N.RN.1	Scientific notation	www.brightstorm.com/math/ (Lab) Cooperative Learning and Mathematics pg. 28 (Lab) Cooperative Learning and Mathematics pg. 29
2-2 Evaluate and Graph Polynomial Functions	F.IF.7c F.IF.4	Polynomial Polynomial function Synthetic substitution End behavior	http://www.bb.minnetonka.k12.mn.us/webapps/cmsmain/webui/institution/MHS/Departments/Math/Higher%20Algebra/HA%20Complete%202009%20-%202010/Higher%20Degree%20Polynomials?action=frameset&subaction=view&uniq=xsm1xc&mask=/institution/MHS/Departments/Math
2-3 Add, Subtract, and Multiply Polynomials	A.APR.1 A.SSE.2 A.APR.4 F.BF.1	Like terms	www.brightstorm.com/math/
2-4 Factor and Solve Polynomial Equations	A.SSE.2 A.SSE.3 A.APR.3 A.APR.4 A.CED.1	Factored completely Factor by grouping Quadratic form	Difference of Squares More Factoring (Comp) Exploring Algebra with Geometer's Sketchpad pg. 29,30 
2-5 Apply the Remainder and Factor Theorems	A.APR.2 A.SSE.2 A.SSE.3 A.APR.3	Polynomial long division Synthetic division	Dividing Polynomials http://exchange.smarttech.com/search.html?q=synthetic+division&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US
2-6 Find Rational Zeros	A.APR.2 N.CN.7 A.APR.3 A.CED.1	Zero of a function Constant term Leading coefficient	Roots of Polynomials (Java)  Exploring Polynomial Equations
2-7 Apply the Fundamental Theorem of Algebra	N.CN.9+ N.CN.7 N.CN.8+ A.APR.3 F.IF.7	Repeated solution Irrational conjugates Complex conjugates Descartes Rule of Signs	Theorems about roots of polynomials http://exchange.smarttech.com/search.html?q=irrational+conjugates&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_

			US
2-8 Analyze Graphs of Polynomial Functions	F.IF.7c N.CN.9+ A.APR.3 A.CED.2 F.IF.4 F.IF.5	Local maximum Local minimum (relative maximum and relative minimum) Turning Points	Polynomial Root Dragging http://www.bb.minnetonka.k12.mn.us/webapps/cmsmain/webui/institution/MHS/Departments/Math/Higher%20Algebra/HA%20Complete%202009%20-%202010/Higher%20Degree%20Polynomials?action=frameset&subaction=view&uniq=xsm1xc&mask=/institution/MHS/Departments/Math

Chapter 3: Rational Exponents
Timeline: 6 days

Common Core Standards

N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.

N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.

A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

F.BF.1 Write a function that describes a relationship between two quantities.

F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F.BF.4 Find the inverse functions.

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

F.IF.7b Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
3-1 Evaluate nth Roots and Use Rational Exponents	N.RN.1 A.REI.2	*n*th root of *a* index of radical	Simplify the following:

			$5\sqrt{12}-3\sqrt{75}$ $\frac{3x}{\sqrt[3]{x}}$ $32^{\frac{4}{5}} \cdot 32^{\frac{2}{5}}$
3-2 Apply Properties of Rational Exponents	N.RN.2 N.RN.1	Simplest form of a radical Like radicals	Review Properties of Rational Exponents Review Rationalizing Denominators Rational Exponents Notes & Examples
3-3 Perform Function Operations and Composition	F.BF.1 A.CED.2	Power (exponential) function composition	Combinations of Functions (Lab) Cooperative Learning & Mathematics, pg. 351 Exploration 8 pg 8. P*recalculus and Trig Explorations*, Paul Foerster Composite Functions http://www.youtube.com/watch?v=S4AEZElTPDo Example: Perform the operations to the given functions: $f(x)=5x-x^2+3x^3$ $g(x)=x^2-3$ Operations: *f(x)* + *g(x)*, *f(x)* – *g(x)*, *f(x)* • *g(x)*, and *f(x)/g(x)*). Examples: Given the following functions: $f(x)=2x-1$ $g(x)=3x+4$ Find $[g \circ f](x)$ and $[f \circ g](x)$
3-4 Use Inverse Functions	F.BF.4 A.CED.4 F.IF.5	Inverse relation Inverse function	Exploring Inverse Functions pg. 189 Functions and Inverses Inverse Functions Inverse Functions Sketchpad Sketches Algebra II

			Exploration 9 pg. 9 P*recalculus and Trig Explorations*, Paul Foerster Example: Determine if this function has an inverse. If the function has an inverse, find and graph the inverse function. $f(x) = -3x + 1$
3-5 Graph Square Root and Cube Functions	F.IF.7b F.IF.4 F.IF.5 F.BF.3	Radical function Parent function	Examples: Discuss the differences between $f(x)$ and $g(x)$ $f(x) = x$ and $g(x) = x + 3$ $f(x) = x^2$ and $g(x) = (x+1)^2 - 2$ $f(x) = \lvert x \rvert$ and $g(x) = \lvert x - 2 \rvert + 3$
3-6 Solve Radical Equations	A.REI.2 N.RN.2 A.REI.11	Radical equation Rational exponents Extraneous solution	Solving Radical Equations Example: $\sqrt[3]{2w-1} + 11 = 18$

Chapter 4: Exponential and Logarithmic Functions
Timeline: 6 days

Common Core Standards

A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

A.SSE.1 Interpret expressions that represent a quantity in terms of its context (Modeling standard).

A.SSE.1b Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r)n as the product of P and a factor not depending on P.

A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

F.BF.4b (+) Verify by composition that one function is the inverse of another.

F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F.BF.5 (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.7e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

F.IF.8b Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)t, y = (0.97)t, y = (1.01)12t, y = (1.2)t/10, and classify them as representing exponential growth or decay.

F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

F.LE.4 For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where ab, b, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.

F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.

S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

Textbook Correlations	Standard	Vocabulary	Resources/Examples

4-1 Graph Exponential Growth Functions	F.IF.7e A.SSE.1b F.IF.4 F.IF.8b F.BF.3 F.LE.5	Exponential function Exponential growth function Growth factor Asymptote Translations Compound interest	Graphing Exponential Functions Exploring Functions with TI-83 pg. 37 (Comp) Web Quest Projects Unit 3 (Glencoe website) Example: A bacteria will grow from 500 to 4000 bacteria in 1.5 hours. Find the constant K for the growth formula. Use $y = ae^{kt}$
4-2 Graph Exponential Decay Functions	F.IF.7e A.SSE.1b F.IF.4 F.IF.8b F.BF.3 F.LE.5	Exponential decay function Decay factor	www.explorelearning.com Dye Elimination Activity - Gizmos **Nevada's Population** Activity for TI84 . Data Activities: Modeling Algebraic Functions with Datra Collection Activities by Marilyn J. Parker (ISBN # 1-886309-74-4)
4-3 Use Functions Involving *e*	F.IF.7e A.SSE.1b F.IF.4 F.IF.8b F.BF.3 F.LE.5	Natural base *e* Continuously compounded interest	Review Properties of exponents Pg. 88 http://www.youtube.com/watch?v=LzRw1ce9gH4&feature=bf_next&list=PL77D0ECC1045DCA29
4-4 Evaluate Logarithms and Graph Logarithmic Functions	F.IF.7e F.BF.3 F.BF.4b F.BF.5	Logarithm of *y* with base *b* Common logarithm Natural logarithm	www.explorelearning.com Logarithmic Functions Activity A - Gizmos Logarithmic Functions Activity B – Gizmos Simplify the following expression of logarithms: $3\log_2 4x + 2\log_2 2x$
4-5 Apply Properties of Logarithms	F.BF.5+ A.SSE.1 A.SSE.3	Base Change of base formula	http://www.youtube.com/watch?v=pZqDXF-hA18
4-6 Solve Exponential and Logarithmic Equations	F.LE.4 A.REI.2 F.BF.5	Exponential equation Logarithmic equation Extraneous solution	Solving Exp and Log Equations Example: Solve the equation: $\log_2 x = 5$ Solve: $\log_3 12 = \log_3 2x$ Examples: Solve for x: $5e^{-x} - 7 = 2$

			Solve for x: ln 5x = 4 Graph the exponential equations and solve: $2^{3x-9} = \left(\frac{1}{2}\right)^{x-3}$ Graph the logarithmic functions and solve: $\log_2 2x = \log_{\frac{1}{2}} 2x$
4-7 Write and Apply Exponential and Power Functions	F.LE.2 F.IF.8 S.ID.6	Power function Exponential function Exponential regression	7 Investigating Activity text P280

Chapter 5: Rational Functions
Timeline: 7 days

Common Core Standards

A.APR.7 (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.

A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

F.IF.6 Calculate and interpret average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

F.IF.7d (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale

and the origin in graphs and data displays.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
5-1 Model Inverse and Joint Variation	A.CED.2 N.Q.1 A.CED.4	Inverse variation Constant of variation Joint variation	http://www.lemars.k12.ia.us/webfiles/mboyd/Algebra%201A%20&%201B%20Textbook%20(e-edition)/Source/CAP11CBD.pdf http://higheredbcs.wiley.com/legacy/college/young/0471659584/add_topics/variation.pdf http://www.khanacademy.org/math/algebra/algebra-functions/v/direct-inverse-and-joint-variation http://illuminations.nctm.org/LessonDetail.aspx?id=L729
5-2 Graph Simple Rational Functions	F.IF.7d A.CED.2 F.IF.4 F.IF.5 F.BF.3	Rational function Domain Range asymptote	Specialty Functions (Sketchpad) Examples: Graph the rational function: $f(x)=\frac{(x-5)}{(x+4)}$ Discuss range and domain. Examples: Graph the rational function: $f(x)=\frac{(x-4)}{(x-4)(x-5)}$ Discuss range and domain. Examples: Graph the rational function: $f(x)=\frac{(x-4)(x-5)}{(x-4)}$ Discuss range and domain.
5-3 Graph General Rational Functions	F.IF.7d A.CED.2 A.CED.4 F.IF.4	End behavior Asymptote Rational function	Translations of Quadratics  Graph Classic Functions Specialty Functions (Sketchpad)

5-4 Multiply and Divide Rational Expressions	A.APR.7	Simplified form of a rational expression Reciprocal	Examples: Simplify $\frac{x^2-4}{x^5} \div \frac{x^3-8}{x^8}$ or $(\frac{5}{x-2} + \frac{2}{x+3}) \div (\frac{1}{x+3} + \frac{7}{x-2})$.
5-5 Add and Subtract Rational Expressions	A.APR.7	Complex fraction	Review operations with like & unlike denominators
5-6 Solve Rational Equations	A.REI.2 A.CED.1 A.REI.1 A.REI.11	Cross multiplying Extraneous solution	Example: Solve $\frac{10}{n} + \frac{5}{n^2-4} = \frac{7}{n-2}$ (Calc) Activities for Algebra with the TI-83 Plus Activity 14 (Calc) Discovering Algebra Vol. 2 Lesson 9.6
5-7 Describe and Compare Function Characteristics	F.IF.9 F.IF.4 F.IF.6 F.BF.3 F.LE.3	Increasing Decreasing Odd function Even function	Graph Polynomial Functions using End Behavior http://exchange.smarttech.com/search.html?q=even+odd+functions&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US

Chapter 7: Sequences and Series
Timeline: 6 days

Common Core Standards

A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

A.SSE.4 Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.

F.BF.1 Write a function that describes a relationship between two quantities.

F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n + 1) = f(n) + f(n - 1)$ for $n \geq 1$.

F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.

F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
7-1 Define and Use Sequences and Series	F.IF.3 F.BF.1 F.BF.2	Sequence Terms of a sequence Series Summation notation Sigma notation	Formulas for special series Spreadsheet Investigation, textbook pg. 605 Algebra Activity: Special Sequences, textbook pg. 607
7-2 Analyze Arithmetic Sequences and Series	F.BF.2 F.LE.2 F.LE.5	Arithmetic sequence Common difference Arithmetic series	http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=340 Arithmetic and Geometric Sequences - Gizmos
7-3 Analyze Geometric Sequences and Series	A.SSE.4 F.BF.2 F.LE.2 F.LE.5	Geometric sequence Common ratio Geometric series	Arithmetic and Geometric Sequences - Gizmos Mathlets: Sequences and Series
7-4 Find Sums of Infinite Geometric Series	A.SSE.3	Partial sum	Investigating Activity pg. 459 NCTM Illuminations LIMITS Limits (Geometric Series)

			Zeno's Paradox pg. 14 *Exploring Advanced Algebra with the TI83*, Brendan Kelly
7-5 Use Recursive Rules with Sequences and Functions	F.BF.2 F.IF.3 F.BF.1 F.LE.1 F.LE.5	Explicit rule Recursive rule Iteration	Recursive Sequences

Chapter 8: Quadratic Relations and Conic Sections
Timeline: 6 days

Common Core Standards

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

A.REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x_2 + y_2 = 3$.

A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

G.GPE.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

G.GPE.2 Derive the equation of a parabola given a focus and directrix.

G.GPE.3 Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.

G.GPE.4 Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point (0, 2).

G.GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
8-1 Apply the Distance and Midpoint Formulas	G.GPE.4 G.GPE.7	Distance formula Midpoint formula	http://exchange.smarttech.com/search.html?q=distance+midpoint&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US
8-2 Graph and Write Equations of Parabolas	G.GPE.2 A.CED.2 A.CED.3 A.REI.10	Focus Directrix Parabola Vertex	Graphing Conic Sections http://exchange.smarttech.com/search.html?q=parabolas&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US#page=3
8-3 Graph and Write Equations of Circles	G.GPE.1 A.CED.2 A.CED.3 A.REI.10	Circle Center Radius	Interactive Circles (Comp) Web Quest Projects Unit 3 (Glencoe website)  GeoGebra Dynamic Worksheets 2008

			Conics Interesting Properties Conics Defs & Graphs
8-4 Graph and Write Equations of Ellipses	G.GPE.3 A.SSE.3 A.CED.2 A.REI.10	Ellipse Foci Vertices Major axis Center Co-vertices Minor axis	Textbook Lab 12-3 p. 837 Constructing an Ellipse (Calc) Exploring Functions with TI-83 pg. 52 (Comp/Lab) Exploring Conic Sections with Geometer's Sketchpad pg. 5-29 GeoGebra: Ellipse Definitiion Ellipses: Major / Minor Axis of an ellipse
8-5 Graph and Write Equations of Hyperbolas	G.GPE.3 A.SSE.3 A.CED.2 A.REI.10	Hyperbola Foci Vertices Transverse axis Center	http://www.explorelearning.com Hyperbola Activity A Constructing a hyperbola (Calc) Exploring Functions with TI-83 pg. 56 (Comp/Lab) Exploring Conic Sections with Geometer's Sketchpad pg. 52-56 GeoGebra: Hyperbola Definition
8-6 Translate and Classify Conic Sections	G.GPE.3 A.SSE.3 G.GPE.1 G.GPE.2	Conic sections General second-degree equation Discriminant	A Helping Hand "Conic Picture Project" pg. 13-16 Conic Sections (Java)
8-7 Solve Quadratic Systems	A.REI.7	Quadratic system	Review solving systems by graphing, substitution, and elimination. Example: Solve the system of equations: $y + 20 = x^2$ $y + x = 0$

Teacher Note: Honors classes are expected to graph all conics with center translated off Origin (0,0) to another point (h,k). This includes completing the square to locate center given equation in standard form.

Chapter 6: Data Analysis and Statistics
Timeline: 6 days

Common Core Standards

A.APR.5 (+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.

S.MD.3 (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.

S.MD.6 (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).

S.MD.7 (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

S.ID.4 Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

S.IC.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population.

S.IC.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

S.IC.4 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.

S.IC.6 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
6-1 Use Combinations and the Binomial Theorem	A.APR.5	Combination Pascal's triangle Binomial theorem	Formulas for special series Probability Permutations, Combinations, Probability TI Activity More Probability The Geometer's Sketchpad Statistic Collection Fathom Resource Center Data & Simulations • Activities • Student Projects • Demonstrations • AP Statistics Link Fathom 2.0 free for 60 Days

			• http://www.regentsprep.org/regents/math/algebra/APR1/indexAPR1.htm • http://www.algebra-class.com/fundamental-counting-principle.html • http://tamathawis.weebly.com/uploads/8/0/5/3/8053076/6.1_-_fundamental_counting_principle.pdf • 1. Factorials • 2. Permutations • http://education.ti.com/calculators/timath/US/Activities/Detail?sa=1010&id=10076 • http://education.ti.com/calculators/timath/US/Activities/Detail?sa=1010&id=12601 3. Combinations • http://education.ti.com/calculators/timath/US/Activities/Detail?sa=1010&id=12601 • http://education.ti.com/calculators/timath/US/Activities/Detail?sa=1010&id=10126
6-2 Construct and Interpret Binomial Distribution	S.MD.3 A.APR.5 S.MD.7	Random variable Probability distribution Binomial distribution Binomial experiment Symmetric Skewed	The Binomial Theorem http://education.ti.com/calculators/timath/US/Activities/Detail?sa=1010&id=10253 http://education.ti.com/calculators/timath/US/Activities/Detail?sa=1010&id=10234 http://education.ti.com/calculators/timath/US/Activities/Detail?sa=5026&id=11936 http://education.ti.com/calculators/timath/US/Activities/Det

			ail?sa=5026&id=9415
6-3 Use Normal Distributions	S.ID.4 S.MD.7	Normal distribution Normal curve Standard normal distribution *z*-score	http://education.ti.com/calculators/timath/US/Activities/Detail?sa=1010&id=10279
6-4 Select and Draw Conclusions from Samples	S.IC.1 S.IC.3 S.IC.4 S.MD.6	Population Sample Unbiased sample Biased sample Margin of error	Sampling and Experimenting http://exchange.smarttech.com/search.html?q=observational+study+&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US
6-5 Compare Surveys, Experiments, and Observational Studies	S.IC.3 S.IC.1 S.IC.6 S.MD.6 S.MD.7	Biased questions Experiment Observational study Controlled experiment Control group Treatment group Randomized comparative experiment	Sampling and Experimenting http://exchange.smarttech.com/search.html?q=observational+study+&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US

Chapter 9: Trigonometric Ratios and Functions
Timeline: 6 days

Common Core Standards

G.SRT.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

G.SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

G.SRT.9 (+) Derive the formula A = 1/2 ab sin(C) for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.

G.SRT.10 (+) Prove the Laws of Sines and Cosines and use them to solve problems.

G.SRT.11 (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).

F.BF.4d (+) Produce an invertible function from a non-invertible function by restricting the domain.

F.TF.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.

F.TF.2 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.

F.TF.3 (+) Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for $\pi-x$, $\pi+x$, and $2\pi-x$ in terms of their values for x, where x is any real number.

F.TF.6 (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.

F.TF.7 (+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.

G.C.5 (+) Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
9-1 Use Trigonometry with Right Triangles	G.SRT.6 G.SRT.8	Sine Cosine Tangent Cosecant Secant Cotangent	http://www.thefutureschannel.com/hands-on_math/triangular_toys.php Right Triangles and Trig Ratios Example: Solve right triangle ABC. Round measures of sides to the nearest tenth and measures of angles to the nearest degree.

			Trig Rap-Gettin Triggy with it. http://www.youtube.com/watch?v=t2uPYYLH4Zo
9-2 Define General Angles and Use Radian Measure	F.TF.1 F.TF.2 F.TF.3 G.C.5	Initial side Terminal side Standard position Coterminal Radian Sector Central angle	Exploration 12 pg 13 P*recalculus and Trig Explorations*, Paul Foerster Exploration 17-18 pg 18-19 P*recalculus and Trig Explorations*, Paul Foerster  Trigonometry  Vertical Team (kite)  Vertical Team (clock)
9-3 Evaluate Trigonometric Functions of Any Angle	F.TF.2 F.TF.3	Unit circle Quadrantal angle Reference angle	Rewrite the degree measure in radians and the radian measure in degrees a. 240^0 b. $\frac{\pi}{12}$ Example: Find the exact value of all six trigonometric functions of 150^0.
9-4 Evaluate Inverse Trigonometric Functions	F.TF.6 F.BF.4d F.TF.7	Inverse sine Inverse cosine Inverse tangent	Investigating Activity text P578 http://www.brightstorm.com/math/precalculus/advanced-trigonometry/the-inverse-cosine-function/#
9-5 Apply the Law of Sines	G.SRT.11 F.TF.7 G.SRT.9 G.SRT.10	Law of sines	Example: Find the area of triangle ABC to the nearest tenth given: $a = 5$ c=6 and $\measuredangle$B=112^0 Example: In triangle ABC, $A = 118^0, a = 20,$ and $b = 17$. Solve for triangle ABC Round measures of sides to the nearest tenth and measures of angles to the nearest degree in DMS format.
9-6 Apply the Law of Cosines	G.SRT.11 F.TF.7 G.SRT.10	Law of cosines	Law of Cosines  Vertical Team (ladder)

			 Vertical Team (open box)  What if (Cycloids, Sq Wheels, Ferris Example: (word problem) A medical rescue helicopter has flown from its home base a point C to pick up an accident victim at point B and then from there to the hospital at point A. The pilot needs to know how far he is now from his home base so he can decide whether to refuel before returning. How far is the hospital from the helicopter's base?

Chapter 10: Trigonometric Graphs, Identities, and Equations
Timeline: 8 days

Common Core Standards

A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

F.IF.7e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

F.IF.4 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F.TF.4 (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.

F.TF.5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.

F.TF.7 (+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.

F.TF.8 Prove the Pythagorean identity $\sin_2(\theta) + \cos_2(\theta) = 1$ and use it to find sin (θ), cos (θ), or tan (θ), given sin (θ), cos (θ), or tan (θ), and the quadrant of the angle.

F.TF.9 (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.

G.SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.

S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
10-1 Graph Sine, Cosine, and Tangent Functions	F.IF.7e F.IF.4 F.BF.3 F.TF.4 F.TF.5	Amplitude Periodic function Cycle Period Frequency	 Trigonometric Functions-Graphical Visualization. Trigonometric Functions Math Bits GSP

10-2 Translate and Reflect Trigonometric Graphs	F.TF.5 F.IF.4 F.IF.7e F.BF.3	Translation Reflection Amplitude Period	http://exchange.smarttech.com/search.html?q=trigonometric+translations&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US
10-3 Verify Trigonometric Identities	F.TF.8 G.SRT.7	Trigonometric identity	http://mathbits.com/MathBits/TISection/trig/trigidentity.htm http://exchange.smarttech.com/search.html?q=trigonometric+identity&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US
10-4 Solve Trigonometric Equations	F.TF.7 A.REI.11 F.TF.7 F.TF.8	Extraneous solution	http://earthmath.kennesaw.edu/main_site/review_topics/trig_equations.htm http://www.regentsprep.org/Regents/math/algtrig/ATT10/trigequations2.htm
10-5 Write Trigonometric Functions and Models	F.TF.5 F.IF.4 S.ID.6	Sinusoid	http://exchange.smarttech.com/search.html?q=trigonometric+sinusoid&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US
10-6 Apply Sum and Difference Formulas	F.TF.9 F.TF.7	Trigonometric identity	http://www.regentsprep.org/Regents/math/algtrig/ATT14/formulalesson.htm
10-7 Apply Double-Angle and Half-Angle Formulas	F.TF.9 F.TF.7 F.TF.8	Sine Cosine Tangent	http://exchange.smarttech.com/search.html?q=double+half+angle&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US

Chapters 1-5 requires 36 days **Chapters 7,8,6,9,10 requires 32 days**

Calculus Honors Consensus Map

Calculus: An Applied Approach (8th Edition)
Ron Larson

Helpful websites to check out and share with students:

http://www.businessbookmall.com/Calculus%20Videos.htm
http://www.khanacademy.org/#calculus
http://ocw.mit.edu/resources/res-18-005-highlights-of-calculus-spring-2010/
http://www.businessbookmall.com/Quick%20Notes%20Calculus%20Course.htm
http://www.khanacademy.org/
http://designatedderiver.wikispaces.com/
http://www.youtube.com/user/RobbWorld
http://online.math.uh.edu/HoustonACT/
http://midnighttutor.com/PrecalculusFull.html **(for students who need Precalculus review)**

Chapter 1: Functions, Graphs, and Limits; Section 3.6; Section 8.3
Timeline: 11 days

Textbook Correlations	Breakdown	Resources/Examples
Section 1.5: Limits Quiz on Section 1.5	3 days ½ day	http://www.sophia.org/help-with-limits-as-x-approaches-a-number-tutorial http://designatedderiver.wikispaces.com/We+Belong+Together+Limits+Lab
Section 1.6: Continuity	2 days	Enrichment: In text, p. 104:#61
Section 3.6: Asymptotes (Limits only)	2 days	http://www.sosmath.com/calculus/limcon/limcon04/limcon04.html
Section 8.3: Graphs of Trigonometric Functions (Limits only) Review for Test Test on Sections 1.5, 1.6, and 3.6	1 day 1 day 1 day	http://mathvids.com/lesson/mathhelp/394-trigonometric-limits

Chapter 2: Differentiation
Timeline: 31 days

Textbook Correlations	Breakdown	Resources/Examples
Section 2.1: The Derivative and the Slope of a Graph	2 days	http://www.sosmath.com/calculus/diff/der00/der00.html
Section 2.2: Some Rules for Differentiation Quiz on Sections 2.1 and 2.2	3 days ½ day	http://www.nuffieldfoundation.org/fsmqs/level-3-calculus (Gradients) Enrichment: In text, p.137: #61, 63

Section 2.3: Rates of Change: Velocity and Marginals	2 days	http://www.sosmath.com/calculus/diff/der00/der00.html
Section 2.4: The Product and Quotient Rules Quiz on Section 2.4 Review for Test Test on Sections 2.1, 2.2, 2.3, and 2.4	4 days ½ day 1 ½ days 1 day	Enrichment: In text, p. 163: #65 http://www.mathingo.com/choose_categories.cgi http://designatedderiver.wikispaces.com/Practice+Worksheets-+Derivatives
Section 2.5: The Chain Rule Quiz on Section 2.5	3 days ½ day	http://www.1728.org/chainrul.htm
Section 2.6: Higher-Order Derivatives	2 days	Enrichment: In text, p. 180: #51 http://www.intmath.com/differentiation/9-higher-derivatives.php
Section 2.7: Implicit Differentiation Review for Test Test on Sections 2.6, 2.7, and 2.8	3 days 1 day 1 day	Enrichment: In text, p. 187: #47
Section 2.8: Related Rates Review for Test Test on Section 2.8	4 days 1 day 1 day	http://www.usna.edu/MathDept/website/courses/calc_labs/relatedrates/rates.html http://realteachingmeansreallearning.blogspot.ca/2012/03/rate-of-change-of-beaker.html?m=1 http://www.scribd.com/doc/6706503/2008-RelatedRatesMatchLab http://www.mastermathmentor.com/mmm/Free.aspx?bin=calc.Projects&file=Related Rates.pdf

Chapter 3: Applications of the Derivative
Timeline: 20 days

Textbook Correlations	Breakdown	Resources/Examples
Section 3.1: Increasing and Decreasing Functions	2 days	Enrichment: In text, p. 214: #43
Section 3.2: Extrema and the First Derivative Test Quiz on Sections 3.1 and 3.2	2 days ½ day	
Section 3.3: Concavity and the Second-Derivative Test Review for Test Test on Sections 3.1, 3.2, and 3.3	2 days 1 day 1 day	http://www.nuffieldfoundation.org/fsmqs/level-3-calculus (Stationary Points) http://www.chaoticgolf.com/worksheets/calc/academy/4_3.pdf Enrichment: In text, p. 234: #75
Section 3.4: Optimization Problems	3 days	http://www.nuffieldfoundation.org/fsmqs/level-3-calculus (Maxima and Minima) and (Maximising and Minimising)
Section 3.5: Business and Economics Applications	2 days	
Section 3.6: Asymptotes (Applications of Asymptotes) Quiz on Sections 3.4, 3.5, and 3.6	1 day ½ day	Enrichment: In text, p. 265: #61, 62
Section 3.7: Curve Sketching: A Summary Review for Test Test on Sections 3.4, 3.5, 3.6, and 3.7	3 days 1 day 1 day	http://www.nuffieldfoundation.org/fsmqs/level-3-calculus (Derivative Matching) http://www.usna.edu/MathDept/website/courses/calc_labs/deriv/Deriv.html <http://clem.mscd.edu/%7Etalmanl/MTH1410U08/Pictures_080529/> Enrichment: In text, p. 274: #55

Chapter 4: Exponential and Logarithmic Functions
Timeline: 14 days

Textbook Correlations	Breakdown	Resources/Examples
Section 4.1: Exponential Functions	1 day	Enrichment: In text, p. 298: #37
Section 4.2: Natural Exponential Functions	1 day	
Section 4.3: Derivatives of Exponential Functions	3 days	http://www.nuffieldfoundation.org/fsmqs/level-3-calculus
Quiz on Sections 4.1, 4.2, and 4.3	½ day	(Exponential Rates of Change)
Section 4.4: Logarithmic Functions	1 day	Enrichment: In text, p. 325: #88
Section 4.5: Derivatives of Logarithmic Functions	3 days	Enrichment: In text, p. 334: #85
Section 4.6: Exponential Growth and Decay	2 days	Enrichment: In text, p. 343: # 41
Review for Test	1 day	
Test on Chapter 4	1 day	

Chapter 8: Trigonometric Functions
Timeline: 5 days

Textbook Correlations	Standard	Resources/Examples
Section 8.4: Derivatives of Trigonometric Functions	3 days	
Review for Test	1 day	
Test on Section 8.4	1 day	

Chapter 5: Integration and Its Applications **Timeline: 6 days**		
Textbook Correlations	**Breakdown**	**Resources/Examples**
Section 5.1: Antiderivatives and Indefinite Integrals	2 days	Enrichment: In text, p. 364: 79
Section 5.4: Area and the Fundamental Theorem of Calculus	2 days	Enrichment: In text, p. 393: #9
Review for Test	1 day	
Test on Sections 5.1 and 5.3	1 day	

Chapter 1: Foundations for Geometry
Timeline: 7 days

Common Core Standards

G-CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G-CO.2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

G-CO.3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

G-CO.4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

G-CO.5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

G-CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.*

A-SSE.1. Interpret expressions that represent a quantity in terms of its context.★

- Interpret parts of an expression, such as terms, factors, and coefficients.
- Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret* $P(1+r)^n$ *as the product of P and a factor not depending on P.*

A-CED.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*

G-GPE.7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.★

Textbook Correlations	Standard	Vocabulary	Resources/Examples
1-1 Understanding Points, Lines, and Planes	G-CO.1	collinear coplanar endpoint line – (visual aid) opposite ray plane point postulate ray – (visual aid) segment – (visual aid) undefined term	Points, Lines and Planes Interactive Applet SMART http://exchange.smarttech.com/search.html?q=#mediator=380fc8e5-5ce4-4c5e-8dce-56fbb0f5d502

1-2 Measuring and Constructing Segments	G-CO.12	between bisect congruent segments construction coordinate distance length midpoint segment bisector	Segment Addition Postulate
1-3 Measuring and Constructing Angles	G-CO.1 G-CO.12	acute angle angle angle bisector congruent angle degree exterior of an angle interior of an angle measure obtuse angle right angle straight angle vertex	Common Core: Challenges from Ancient Greece-Page 40 Constructions-With printable worksheets Angle Measure with a Protractor Angle Bisector Performing Constructions
1-4 Pairs of Angles	G-CO.1	adjacent angles complementary angles linear pair supplementary angles vertical angles	Adjacent Angles Gizmo 1 Adjacent Angles Gizmo 2 Angle Relationships
1-5 Using Formulas in Geometry	A-SSE.1 A-CED.4	area - (visual aid) base circumference diameter height perimeter - (visual aid) pi radius	
1-6 Midpoint and Distance in the Coordinate Plane	G-GPE.7	coordinate plane hypotenuse leg	Distance Distance Gizmo Distance between two points Midpoint of a line segment (Midpoint Theorem)
1-7 Transformations in the Coordinate Plane	G-CO.2 G-CO.4 G-CO.5	image pre-image reflection – (visual aid) rotation – (visual aid) transformation translation – (visual aid)	Common Core: An Interactive Introduction to Transformational Geometry Translations Rotations Reflections Rotations, Reflections, Translations Gizmo SMART http://exchange.smarttech.com/search.html?q=translations&subject=Ma

			thematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US
9-5 Symmetry	G-CO.2 G-CO.3 G-CO.5	line of symmetry line symmetry rotational symmetry symmetry	Line of Symmetry

Chapter 2: Geometric Reasoning
Timeline: 8 days/Through Day 15

Common Core Standards

G-CO.9. Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*

G-CO.10. Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*

G-CO.11. Prove theorems about parallelograms. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*

G-SRT.4. Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*

Textbook Correlations	Standard	Vocabulary	Resources/Examples
2-1 Using Inductive Reasoning to Make Conjectures	G-CO.9 G-CO.10 G-CO.11 G-SRT.4	conjecture counterexample inductive reasoning	Inductive Reasoning
2-2 Conditional Statements	G-CO.9 G-CO.10 G-CO.11 G-SRT.4	conclusion conditional statement contrapositive converse hypothesis inverse logically equivalent statements negation truth value	Conditionals Gizmo
2-3 Using Deductive Reasoning to Verify Conjectures	G-CO.9 G-CO.10 G-CO.11 G-SRT.4	deductive reasoning	Deductive Reasoning Activity
2-5 Algebraic Proof	G-CO.9 G-CO.10 G-CO.11 G-SRT.4	proof	Properties of Algebra-Flashcards Writing Proofs
2-6 Geometric Proof	G-CO.9	theorem two-column proof	

Chapter 3: Parallel and Perpendicular Lines
Timeline: 6 days/Through Day 21

Common Core Standards

G-CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G-CO.9. Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*

G-CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.*

G-GPE.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

Textbook Correlations	Standard	Vocabulary	Resources/Examples
3-1 Lines and Angles	G-CO.1	alternate exterior angles alternate interior angles corresponding angles parallel lines parallel planes perpendicular lines same-side interior angles skew lines transversal	Investigate Lines and Planes SMART http://exchange.smarttech.com/search.html?q=transversals&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US
3-2 Angles Formed by Parallel Lines and Transversals	G-CO.9 G-CO.12		Definition of parallel lines Transversal Corresponding angles Alternate interior angles Alternate exterior angles Interior angles of a transversal Exterior angles of a transversal
3-3 Proving Lines Parallel	G-CO.9 G-CO.12		Common Core: Lunch Lines-Page 29
3-4 Perpendicular Lines	G-CO.9 G-CO.12	distance from a point to a line perpendicular bisector	
3-5 Slopes of Lines	G-GPE.5	rise run slope	Slope review
3-6 Lines in the Coordinate Plane	G-GPE.5	point-slope form slope-intercept form	Graphical Linear Function Explorer Slope (m) of a line Intercept (b) of a line Equation of a line in slope-intercept form

			Equation of a line in point-slope form Common Core: Equations of Parallel & Perpendicular Lines Activity Common Core: Constructing Parallel and Perpendicular Lines-Page 46

Chapter 4: Triangle Congruence
Timeline: 9 days/Through Day 30

Common Core Standards

G-CO.6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

G-CO.7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

G-CO.8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

G-CO.10. Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*

G-SRT.5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

G-MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★

Textbook Correlations	Standard	Vocabulary	Resources/Examples
4-1 Congruence and Transformations	G-CO.6 G-CO.7	dilation isometry	Dilations Dilations
4-2 Classifying Triangles	G-CO.10	acute triangle equiangular triangle equilateral triangle isosceles triangle obtuse triangle right triangle – (visual aid) scalene triangle	Triangle definition Acute Obtuse Isosceles Scalene Equilateral Right triangle Smart board "The Triangle Family Portrait"
4-3 Angle Relationships in Triangles	G-CO.10	auxiliary line corollary exterior exterior angle interior interior angle remote interior angle	Triangle Angle Sum Internal angles Exterior angles http://exchange.smarttech.com/search.html?q=isosceles&subject=Mathematics&grade=Grade+9&grade=Grade+10&grade=Grade+11&grade=Grade+12&region=en_US
4-4 Congruent Triangles	G-SRT.5	congruent polygons corresponding angles corresponding sides	Numerical Applications
4-5 Triangle Congruence: SSS and SAS	G-CO.7 G-CO.8 G-SRT.5	included angle triangle rigidity	SSS Congruent Triangles Common Core: Why does SAS work? SAS Congruent Triangles http://exchange.smarttech.com/search.html?q=asa%2C+aas%2C+sss%2C+sas&subject=Mathematics&grade=Grade+9&grade=Grade+10&grad

			e=Grade+11&grade=Grade+12&region=en_US
4-6 Triangle Congruence: ASA, AAS, and HL	G-CO.7 G-CO.8 G-SRT.5	included side	Hypotenuse-Leg Thm Common Core: Are the Triangles Congruent? Common Core: Proving Two Triangles are Congruent-Page 52 AAS Congruent Triangles ASA Congruent Triangles AAA Proving Congruence Gizmo
4-7 Triangle Congruence: CPCTC	G-SRT.5 G-MG.3*	CPCTC	Congruent Triangles Common Core: Triangle Proofs-Page 55
4-9 Isosceles and Equilateral Triangles	G-CO.10	base legs of an isosceles triangle vertex angle	Isosceles and Equilateral Triangles Gizmo Isosceles Triangle

Chapter 5: Properties and Attributes of Triangles
Timeline: 6 days/Through Day 36

Common Core Standards

G-C.3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle

G-CO.9. Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*

G-CO.10. Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*

G-CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.*

G-SRT.4. Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*

G-MG.2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).★

G-MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★

Textbook Correlations	Standard	Vocabulary	Resources/Examples
5-1 Perpendicular and Angle Bisectors	G-CO.9 G-SRT.4	equidistant locus	Perpendicular Bisector
5-2 Bisectors of Triangles	G-C.3 G-CO.12 G-MG.2*	circumcenter of a triangle circumscribed concurrent incenter of a triangle inscribed point of concurrency	Circumcenter Incenter Common Core: Inscribing and Circumscribing Right Triangles Activity
5-3 Medians and Altitudes of Triangles	G-CO.10 G-CO.12 G-MG.3*	altitude of a triangle centroid of a triangle median of a triangle orthocenter of a triangle	Common Core: Centers of Triangles-Page 60 Median Median of a triangle definition Euler Line Special Points and Euler Line Centroid Orthocenter Concurrence Gizmo
5-4 The Triangle Midsegment Theorem	G-CO.10	midsegment of a triangle	Mid-segment Practice with Midsegments
5-5 Indirect Proof and Inequalities in One Triangle	G-CO.10	indirect proof	Indirect Proofs Triangle Inequalities Triangle Inequality Gizmo

			Inequalities in Triangles
5-6 Inequalities in Two Triangles	G-CO.10		Hinge Theorem

Chapter 6: Polygons and Quadrilaterals
Timeline: 7 days/Through Day 43

Common Core Standards

G-CO.11. Prove theorems about parallelograms. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*

G-GPE.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

G-MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★

G-SRT.5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
6-1 Properties and Attributes of Polygons	G-CO.11	concave convex diagonal regular polygon side of a polygon vertex of a polygon	Common Core: Constructions Inscribed in a Circle-Page 48 Polygon Capture Polygon Angles Interior Angles of Quadrilateral Exterior Angles of Quad Interior Angles of Pentagon Exterior Angles of Pentagon Interior Angles of Hexagon Exterior Angles of Hexagon Smartboard "The Quadratic Family Reunion"
6-2 Properties of Parallelograms	G-CO.11	parallelogram	Common Core: Midpoints of the Sides of a Parallelogram Parallelograms Explore the Parallelogram
6-3 Conditions for Parallelograms	G-CO.11 G-GPE.5 G-MG.3		
6-4 Properties of Special Parallelograms	G-CO.11	rectangle rhombus square	Common Core: Proving Quadrilaterals in the Coordinate Plane-Page 68 Rhombus Properties Rectangle Properties Square Properties Explore the Rhombus Explore the Rectangle
6-5 Conditions for Special Parallelograms	G-CO.11		
6-6 Properties of Kites and Trapezoids	G-SRT.5	base angle of a trapezoid base of a trapezoid isosceles trapezoid kite leg of a trapezoid	Common Core: Constructing with Diagonals-Page 63 Kite Properties Explore the Isosceles Trapezoid Proofs using Coordinate Geometry Analytic Proofs using Slope and Distance

		midsegment of a trapezoid trapezoid	

Chapter 7: Similarity
Timeline: 9 days/Through Day 52

Common Core Standards

G-C.1. Prove that all circles are similar.

G-SRT.1. Verify experimentally the properties of dilations given by a center and a scale factor:

- A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.
- The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

G-SRT.2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

G-SRT.3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

G-SRT.4. Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*

G-SRT.5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

G-MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★

Textbook Correlations	Standard	Vocabulary	Resources/Examples
7-1 Ratios in Similar Polygons	G-SRT.2 G.MG.3*	similar similar polygons similarity ratio	Similarity in Polygons Gizmo Similar Figures Gizmo A
7-2 Similarity and Transformations	G-C.1 G-SRT.1		Common Core: Similarity in the Coordinate Plane-Page 15 Similar Triangles
7-3 Triangle Similarity: AA, SSS, and SAS	G-SRT.2 G-SRT.3 G-SRT.4		Common Core: Floodlights Activity Similar triangles test - three angles the same (AAA) Common Core: Are They Similar? Common Core: Similar Triangles-Page 18 Common Core: Proving Similar Triangles-Page 21 Similar triangles test - three sides in proportion (SSS) Similar triangles test - two sides in proportion, included angle equal (SAS)
7-4 Applying Properties of Similar Triangles	G-SRT.2 G-SRT.4 G-SRT.5		Common Core: Shadow Math-Page 20 Similar triangles - ratio of parts Similar triangles - ratio of areas Similar Triangles Applet
7-5 Using Proportional Relationships	G-SRT.5	indirect measurement scale scale drawing	

Chapter 8: Right Triangles and Trigonometry
Timeline: 10 days/Through Day 62

Common Core Standards

G-SRT.4. Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*

G-SRT.6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

G-SRT.8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.★

Textbook Correlations	Standard	Vocabulary	Resources/Examples
8-1 Similarity in Right Triangles	G-SRT.6	geometric mean	Geometric Means
5-7 The Pythagorean Theorem	G-SRT.4 G-SRT.8	pythagorean triple	Common Core: The Pythagorean Theorem – Square Areas Activity Common Core: Proofs of the Pythagorean Theorem Activity Common Core: Pythagorean Theorem using Triangle Similarity-Page 25 Pythagoras' Theorem 3-4-5 triangle Pythagorean triples
5-8 Applying Special Right Triangles	G-SRT.6		Common Core: Discovering Special Triangles-Page 16 30-60-90 triangle 45-45-90 triangle
8-2 Trigonometric Ratios	G-SRT.6	cosine sine tangent trigonometric ratio	Trig RAP-Gettin' Triggy Wit It Common Core: Find That Side or Angle-Page 29 Sine and Cosine Gizmo Sine, Cosine and Tangent Gizmo
8-3 Solving Right Triangles	G-SRT.8		Common Core: Finding Right Triangles in Your Environment-Page 20 Common Core: Create Your Own Triangles-Page 22 Common Core: Discovering Trigonometric Ratio Relationships-Page 27
8-4 Angles of Elevation and Depression	G-SRT.8	angle of depression angle of elevation	Angle of Elevation and Depression Applet SMART.

Chapter 11: Three Dimensional Figures and Volume
Timeline: 5 Days/Through Day 67

Common Core Standards

G-GMD.1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.*

G-GMD.3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★

G-GMD.4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

G-MG.1. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★

G-MG.2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).★

Textbook Correlations	Standard	Vocabulary	Resources/Examples
11-1 Solid Geometry	G-GMD.4 G-GMD.3	cone cross section cube cylinder edge face net prism pyramid vertex	Surface Area of Pyramids and Cones Common Core: Doctor's Appointment Common Core: Volumes of Compound Objects Activity Common Core: Rolling Cups Activity (Video)
11-2 Volumes of Prisms and Cylinders (Review Surface Area)	G-GMD.1 G-GMD.3 G-MG.1 G-MG.2	volume	Surface Area of Prisms and Cylinders Surface and Lateral Area Gizmo Surface Area Gizmo Cubes
11-3 Volumes of Pyramids and Cones (Review Surface Area)	G-GMD.1 G-GMD.3		Surface Area of Pyramids and Cones Common Core: Doctor's Appointment Common Core: Volumes of Compound Objects Activity Common Core: Rolling Cups Activity (Video)
11-4 Spheres	G-GMD.3	center of a sphere great circle hemisphere radius of a sphere sphere	Common Core: Statements about Enlargements Activity Common Core: Volumes of Cylinders, Cones, Pyramids, and Spheres-Page 30

Chapter 12: Circles
Timeline: 8 days/Through Day 75

Common Core Standards

G-C.2. Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle*.

G-C.3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

G-C.4. (+) Construct a tangent line from a point outside a given circle to the circle.

G-C.5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

G-CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.*

G-CO.13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

G-GPE.1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation

Textbook Correlations	Standard	Vocabulary	Resources/Examples
12-1 Lines That Intersect Circles	G-C.2 G-C.4 G-CO.12	chord common tangent concentric circles – (visual aid) congruent circles exterior of a circle interior of a circle point of tangency secant tangent circles tangent of a circle	Circle Basics
12-2 Arcs and Chords	G-C.2 G-CO.12	adjacent arcs arc central angle congruent arcs major arc minor arc semicircle	Common Core: Circles and their Relationships among Central Angles, Arcs, and Chords-Page 9 Arcs and Angles Chords and Arcs Gizmo
12-3 Sector Area and Arc Length	G-C.5	Arc length Segment of a circle	Common Core: Circles and Triangles Activity Common Core: Arc Length and Area of a Sector-Page 24 Circumference and Area Gizmo Area of a Sector
12-4 Inscribed Angle	G-C.2	inscribed angle	Inscribed Angle

	G-C.3 G-CO.12 G-CO.13	intercepted arc subtend	Inscribed Angles and Arcs Gizmo Inscribed Angle Interactive Practice Inscribed Quadrilateral
12-5 Angle Relationships in Circles	G-C.2		Common Core: Two Wheels and a Belt Common Core: Investigating Angle Relationships in Circles-Page 13 Angles in Circles Tangents Constructing a tangent to a circle Two chords angle Two chords angle Practice Two secants angle Two secants angle Practice
12-6 Segment Relationships in Circles	G-C.2	external secant segment secant segment tangent segment	Common Core: Chords, Secants, and Tangents-Page 17 Segments
12-7 Circles in the Coordinate Plane	G-GPE.1		Common Core: Equations of Circles 1 Activity Common Core: Equations of Circles 2 Activity Common Core: Deriving the General Equation of a Circle-Page 10 Equation of Circle

Chapter 13: Probability
Timeline: 6 Days/Through Day 81

Common Core Standards

S-CP.1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").

S-CP.2. Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

S-CP.3. Understand the conditional probability of *A* given *B* as *P*(*A* and *B*)/*P*(*B*), and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*.

S-CP.4. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. *For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.*

S-CP.5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. *For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.*

S-CP.6. Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong to *A*, and interpret the answer in terms of the model.

S-CP.7. Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.

S-CP.8. (+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.

S-CP.9. (+) Use permutations and combinations to compute probabilities of compound events and solve problems.

S-IC.2. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. *For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?*

S-ID.5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

S-MD.7. (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

Textbook Correlations	Standard	Vocabulary	Resources/Examples
13-1 Permutations and Combinations	S-CP.9	combination factorial fundamental counting principle permutation	

13-2 Theoretical and Experimental Probability	S-CP.9 S-MD.7	complement equally likely outcomes event experiment experimental probability favorable outcomes geometric probability outcome probability sample space theoretical probability trial	
13-3 Independent and Dependent	S-CP.2 S-CP.3 S-CP.4 S-CP.6 S-CP.8 S-IC.2 S-ID.5	conditional probability dependent events independent events	Common Core: Modeling Conditional Probabilities –1 Common Core: Modeling Conditional Probabilities – 2 Common Core: How Odd?-Page 11
13-4 Two-Way Tables	S-CP.4 S-CP.5 S-CP.6	conditional relative frequency joint relative frequency marginal relative frequency	
13-5 Compound Events	S-CP.1 S-CP.7	compound event inclusive events mutually exclusive events simple event	

***Optional/If Time Permits**
Chapter 9: Extending Transformational Geometry
Timeline: 5 days/Through Day 86

Common Core Standards

G-CO.2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

G-CO.4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

G-CO.5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

G-CO.6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

G-SRT.1. Verify experimentally the properties of dilations given by a center and a scale factor:

- A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.
- The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
9-1 Reflections	G-CO.2 G-CO.4 G-CO.5 G-CO.6	isometry	Common Core: Reflected Triangles Reflections
9-2 Translations	G-CO.2 G-CO.4 G-CO.5 G-CO.6		
9-3 Rotations	G-CO.2 G-CO.4 G-CO.5 G-CO.6		Rotations
9-4 Composition of Transformations	G-CO.2 G-CO.4 G-CO.5 G-CO.6	glide reflection	Common Core: Representing and Combining Transformations Activity Common Core: Transformations
9-6 Tessellations	G-CO.2 G-CO.5	translation symmetry frieze pattern glide reflection symmetry tessellation regular tessellation semiregular tessellation	
9-7 Dilation	G-CO.2	center of dilation	

	G-SRT.1	enlargement reduction	

***Optional/If Time Permits**
Chapter 10: Extending Perimeter, Circumference, and Area
Timeline: 4 days/Through Day 90

Common Core Standards

A-SSE.1. Interpret expressions that represent a quantity in terms of its context.★

- Interpret parts of an expression, such as terms, factors, and coefficients.
- Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret* $P(1+r)^n$ *as the product of P and a factor not depending on P.*

A-CED.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*

G-GMD.1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.*

G-MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★

G-GPE.7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.★

S-CP.1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").

Textbook Correlations	Standard	Vocabulary	Resources/Examples
10-1 Developing Formulas for Triangles and Quadrilaterals	A-SSE.1 A-CED.4		
10-2 Developing Formulas for Circles and Regular Polygons	G-GMD.1	circle center of a circle center of a regular polygon apothem central angle of a regular polygon	Circumference vs. Diameter Computing Pi Area of Regular Polygons
10-3 Composite Figures	G-MG.3	composite figure	
10-4 Perimeter and Area in the Coordinate Plane	G-GPE.7		
10-6 Geometric Probability	S-CP.1	geometric probability	Geometric Probability Gizmo

Chapter 1: Essential of Geometry
Timeline: 5 days

Common Core Standards

G-CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G-GPE.7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.★

Textbook Correlations	Standard	Vocabulary	Resources/Examples
1.1 Identify Points, Lines, and Planes	G-CO.1	collinear points coplanar points endpoints intersection line segment opposite rays ray undefined terms-point, line, plane	Points, Lines and Planes Interactive Applet
1.2 Use Segments and Congruence	G-CO.1	axiom between congruent segments coordinate distance postulate	Segment Addition Postulate
1.3 Use Midpoint and Distance Formulas	G-GPE.7	midpoint segment bisector	Distance Distance Gizmo Distance between two points Midpoint of a line segment (Midpoint Theorem)
1.4 Measure and Classify Angles	G-CO.1	acute angle angle bisector congruent angles measure of an angle obtuse right sides straight vertex of an angle	Common Core: Challenges from Ancient Greece-Page 40 Constructions-With printable worksheets Angle Measure with a Protractor Angle Bisector Performing Constructions
1.5 Describe Angle Pair Relationships	G-CO.1	adjacent angles complementary angles linear pair supplementary angles vertical angles	Adjacent Angles Gizmo 1 Adjacent Angles Gizmo 2

Chapter 2: Reasoning and Proof
Timeline: 8 days/Through Day 13

Common Core Standards

SMP3. Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

G-CO.9. Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*

A-REI.1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
2.1 Use Inductive Reasoning	SMP3	conjecture counterexample inductive reasoning	Inductive Reasoning
2.2 Analyze Conditional Statements	SMP3	biconditional statement conclusion conditional statement contrapositive converse hypothesis inverse negation perpendicular lines	Conditionals Gizmo Biconditionals Gizmo
2.3 Apply Deductive Reasoning	SMP3	deductive reasoning	Deductive Reasoning Activity
2.4 Use Postulates and Diagrams	G-CO.9	postulate	
2.5 Reason Using Properties from Algebra	A-REI.1	equation	Properties of Algebra-Flashcards
2.6 Prove Statements about Segments and Angles	G-CO.9	proof theorem two-column proof	Writing Proofs
2.7 Prove Angle Pair Relationships	G-CO.9	complementary angles linear pair supplementary angles vertical angles	Angle Relationships

Chapter 3: Parallel and Perpendicular Lines
Timeline: 7 days/Through Day 20

Common Core Standards

G-CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G-CO.9. Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*

G-GPE.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

Textbook Correlations	Standard	Vocabulary	Resources/Examples
3.1 Identify Pairs of Lines and Angles	G-CO.1	alternate exterior angles alternate interior angles consecutive interior angles corresponding angles parallel lines parallel planes skew lines transversal	Investigate Lines and Planes
3.2 Use Parallel Lines and Transversal	G-CO.9	alternate exterior angles alternate interior angles consecutive interior angles corresponding angles	Definition of parallel lines Transversal Corresponding angles Alternate interior angles Alternate exterior angles Interior angles of a transversal Exterior angles of a transversal
3.3 Prove Lines are Parallel	G-CO.9	converse paragraph proof two-column proof	Common Core: Lunch Lines-Page 29
3.4 Find and Use Slopes of Lines	G-GPE.5	rise run slope	Slope review
3.5 Write and Graph Equations of Lines	G-GPE.5	slope-intercept form standard form x-intercept y-intercept	Common Core: Equations of Parallel & Perpendicular Lines Activity Graphical Linear Function Explorer Slope (m) of a line Intercept (b) of a line Equation of a line in slope-intercept form Equation of a line in point-slope form
3.6 Prove Theorems About Perpendicular Lines	G-CO.9	distance from a point to a line	Common Core: Constructing Parallel and Perpendicular Lines-Page 46

Chapter 4: Congruent Triangles
Timeline: 9 days/Through Day 29

Common Core Standards

G-CO.2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

G-CO.6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

G-CO.7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

G-CO.8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

G-CO.10. Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*

G-MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★

Textbook Correlations	Standard	Vocabulary	Resources/Examples
4.1 Apply Triangle Sum Properties	G-CO.10	acute corollary to a theorem equiangular equilateral exterior angles interior angles isosceles obtuse right scalene triangle	Triangle definition Acute Obtuse Isosceles Scalene Equilateral Right triangle Triangle Angle Sum Internal angles Exterior angles
4.2 Apply Congruence and Triangles	G-CO.7	congruent figures corresponding parts	Numerical Applications
4.3 Relate Transformations and Congruence	G-CO.6	rigid motion	Rigid Motion Transformation Congruence
4.4 Prove Triangles Congruent by SSS	G-CO.8	congruent figures corresponding parts	SSS Congruent Triangles
4.5 Prove Triangles Congruent by SAS and HL	G-CO.8	hypotenuse leg of a right triangle	Common Core: Why does SAS work? SAS Congruent Triangles Hypotenuse-Leg Theorem Congruence in Right Triangles Gizmo
4.6 Prove Triangles Congruent by ASA and AAS	G-CO.8	flow proof	Common Core: Are the Triangles Congruent? Common Core: Proving Two Triangles are Congruent-Page 52 AAS Congruent Triangles

			ASA Congruent Triangles AAA Proving Congruence Gizmo
4.7 Use Congruent Triangles	G-CO.10 G-MG.3*		Common Core: Triangle Proofs-Page 55 Congruent Triangles
4.8 Use Isosceles and Equilateral Triangles	G-CO.10	base base angles legs vertex angle	Isosceles and Equilateral Triangles Gizmo Isosceles Triangle
4.9 Perform Congruence Transformations	G-CO.2	congruence transformation image reflection rotation transformation translation	Common Core: An Interactive Introduction to Transformational Geometry Translations Rotations Reflections Rotations, Reflections, Translations Gizmo

Chapter 5: Relationships within Triangles
Timeline: 7 days/Through Day 36

Common Core Standards

G-C.3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle

G-CO.9. Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*

G-CO.10. Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*

G-MG.2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).★

G-GPE.4. Use coordinates to prove simple geometric theorems algebraically. *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2)*.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
5.1 Midsegment Theorem and Coordinate Proof	G-GPE.4	coordinate proof midsegment of a triangle	Midsegment Practice with Midsegments
5.2 Use Perpendicular Bisectors	G-CO.9 G-MG.2	circumcenter concurrent equidistant perpendicular bisector point of concurrency	Circumcenter Perpendicular Bisector
5.3 Use Angle Bisectors of Triangles	G-C.3	angle bisector distance from a point to a line incenter	Incenter Common Core: Inscribing and Circumscribing Right Triangles Activity
5.4 Use Medians and Altitudes	G-CO.10	altitude of a triangle centroid median of a triangle orthocenter	Common Core: Centers of Triangles-Page 60 Median Median of a triangle definition Euler Line Special Points and Euler Line Centroid Orthocenter Concurrence Gizmo
5.5 Use Inequalities in a Triangle	G-CO.10	inequality	Triangle Inequalities Triangle Inequality Gizmo
5.6 Inequalities in Two Triangles and Indirect Proof	G-CO.10	included angle indirect proof	Indirect Proofs Hinge Theorem

Chapter 6: Similarity
Timeline: 8 days/Through Day 44

Common Core Standards

G-C.1. Prove that all circles are similar.

G-CO.2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

G-SRT.2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

G-SRT.3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

G-SRT.4. Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*

G-SRT.5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
6.1 Use Similar Polygons	G-C.1 G-SRT.5	scale factor similar polygons	Similarity in Polygons Gizmo Similar Figures Gizmo A
6.2 Relate Transformations and Similarity	G- SRT.2	dilation scale factor	Common Core: Similarity in the Coordinate Plane-Page 15 Similar Triangles
6.3 Prove Triangles Similar by AA	G- SRT.3	similar polygons	Common Core: Floodlights Activity Similar triangles test - three angles the same (AAA)
6.4 Prove Triangles Similar by SSS and SAS	G- SRT.4	proportion ratio similar polygons	Common Core: Are They Similar? Common Core: Similar Triangles-Page 18 Common Core: Proving Similar Triangles-Page 21 Similar triangles test - three sides in proportion (SSS) Similar triangles test - two sides in proportion, included angle equal (SAS)
6.5 Use Proportionality Theorems	G- SRT.4	corresponding angles ratio proportion	Common Core: Shadow Math-Page 20 Similar triangles - ratio of parts Similar triangles - ratio of areas Similar Triangles Applet
6.6 Perform Similarity Transformations	G- CO.2	center of dilation dilation enlargement reduction scale factor of a dilation transformation	Dilations

Chapter 7: Right Triangles and Trigonometry
Timeline: 8 days/Through Day 52

Common Core Standards

G-SRT.5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

G-SRT.6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

G-SRT.8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

G-SRT.9. (+) Derive the formula A = 1/2 ab sin(C) for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.

G-SRT.10. (+) Prove the Laws of Sines and Cosines and use them to solve problems.

G-SRT.11. (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).

Textbook Correlations	Standard	Vocabulary	Resources/Examples
7.1 Apply the Pythagorean Theorem	G-SRT.8	hypotenuse leg of a right triangle Pythagorean triple right triangle	Common Core: The Pythagorean Theorem – Square Areas Activity Common Core: Proofs of the Pythagorean Theorem Activity Common Core: Pythagorean Theorem using Triangle Similarity-Page 25 Pythagoras' Theorem 3-4-5 triangle Pythagorean triples
7.2 Use the Converse of the Pythagorean Theorem	G-SRT.8	acute triangle obtuse triangle	
7.3 Use Similar Right Triangles	G-SRT.5	altitude of a triangle geometric mean similar polygons	Geometric Means
7.4 Special Right Triangles	G-SRT.6	isosceles triangle	Common Core: Discovering Special Triangles-Page 16 30-60-90 triangle 45-45-90 triangle
7.5 Apply the Tangent Ratio	G-SRT.8	tangent trigonometric ratio	Trig RAP-Gettin' Triggy Wit It
7.6 Apply the Sine and Cosine Ratios	G-SRT.8	angle of depression angle of elevation cosine sine	Common Core: Find That Side or Angle-Page 29 Sine and Cosine Gizmo Sine, Cosine and Tangent Gizmo
7.7 Solve Right Triangles (Include the Law of Sines and Cosines Extension)	G-SRT.8 G-SRT.9 G-SRT.10 G-SRT.11	inverse cosine inverse sine inverse tangent solve a right triangle	Common Core: Finding Right Triangles in Your Environment-Page 20 Common Core: Create Your Own Triangles-Page 22 Common Core: Discovering Trigonometric Ratio Relationships-Page 27 Law of Sines Law of Cosines Solving Triangles

Chapter 8: Quadrilaterals
Timeline: 8 days/Through Day 60

Common Core Standards

G-MG.1. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★

G-CO.11. Prove theorems about parallelograms. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*

G-SRT.5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
1.6 Classify Polygons	G-MG.1	concave convex equiangular equilateral n-gon polygon regular side vertex	Common Core: Constructions Inscribed in a Circle-Page 48 Polygon Capture
8.1 Find Angle Measures in Polygons	G-MG.1	diagonal exterior angle interior angle	Polygon Angles Interior Angles of Quadrilateral Exterior Angles of Quad Interior Angles of Pentagon Exterior Angles of Pentagon Interior Angles of Hexagon Exterior Angles of Hexagon
8.2 Use Properties of Parallelograms	G-CO.11	parallelogram	Common Core: Midpoints of the Sides of a Parallelogram Parallelograms Explore the Parallelogram
8.3 Show that a Quadrilateral is a Parallelogram	G-CO.11	parallelogram	
8.4 Properties of Rhombuses, Rectangles, and Squares	G-CO.11	rectangle rhombus square	Common Core: Proving Quadrilaterals in the Coordinate Plane-Page 68 Rhombus Properties Rectangle Properties Square Properties Explore the Rhombus Explore the Rectangle
8.5 Use Properties of Trapezoids and Kites	G-SRT.5	base angle bases isosceles trapezoid kite legs midsegment of a trapezoid trapezoid	Common Core: Constructing with Diagonals-Page 63 Kite Properties Explore the Isosceles Trapezoid

8.6 Identify Special Quadrilaterals	G-CO.11	kite parallelogram rectangle rhombus square trapezoid	Proofs using Coordinate Geometry Analytic Proofs using Slope and Distance

Chapter 10: Properties of Circles
Timeline: 7 days/Through Day 67

Common Core Standards

G.CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G-C.2. Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle*.

G-C.3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

G-GPE.1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
10.1 Use Properties of Tangents	G-CO.1	center chord circle diameter radius secant tangent	Circumference vs. Diameter Computing Pi Circle Basics
10.2 Find Arc Measures	G-CO.1	central angle congruent arcs congruent circles major arc measure of a major arc measure of a minor arc minor arc semicircle	Common Core: Circles and their Relationships among Central Angles, Arcs, and Chords-Page 9 Arcs and Angles
10.3 Apply Properties of Chords	G-C.2	arc chord semicircle	Chords and Arcs Gizmo
10.4 Use Inscribed Angles and Polygons	G-C.3	circumscribed circle inscribed angle inscribed polygon intercepted arc	Inscribed Angle Inscribed Angles and Arcs Gizmo Inscribed Angle Interactive Practice Inscribed Quadrilateral
10.5 Apply Other Angle Relationships in Circles	G-C.2	chord secant tangent	Common Core: Two Wheels and a Belt Common Core: Investigating Angle Relationships in Circles-Page 13 Angles in Circles Tangents Constructing a tangent to a circle Two chords angle Two chords angle Practice Two secants angle

			Two secants angle Practice
10.6 Find Segment Lengths in Circles	G-C.2	secant segment	Common Core: Chords, Secants, and Tangents-Page 17 Segments
10.7 Write and Graph Equations of Circles	G-GPE.1		Common Core: Equations of Circles 1 Activity Common Core: Equations of Circles 2 Activity Common Core: Deriving the General Equation of a Circle-Page 10 Equation of Circle

Chapter 11: Measurement of Figures and Solids
Timeline: 6 days/Through Day 73

Common Core Standards

G-C.5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

G-SRT.8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.★

G-GMD.1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.*

G-GMD.2. (+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.

G-GMD.3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★

G-GMD.4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

SMP4. Model with mathematics.Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
11.1 Circumference and Arc Length	G-C.5	geometric probability probability	
11.2 Areas of Circles and Sectors	G-C.5 G-GMD.1	sector of a circle	Common Core: Circles and Triangles Activity Common Core: Arc Length and Area of a Sector-Page 24 Circumference and Area Gizmo Area of a Sector
11.3 Areas of Regular Polygons	G-SRT.8	apothem of a polygon center of a polygon central angle of a regular polygon	Area of Regular Polygons
11.4 Use Geometric Probability	SMP4	geometric probability probability	Geometric Probability Gizmo
11.5 Explore Solids	G-GMD.4	base cross section edge face platonic solids polyhedron	Common Core: Tennis Balls in a Can Solids

		regular polyhedron vertex	
11.6 Volume of Prisms and Cylinders (Review Surface Area)	G-GMD.2 G-GMD.3	volume	Surface Area of Prisms and Cylinders Surface and Lateral Area Gizmo Surface Area Gizmo Cubes
11.7 Volumes of Pyramids and Cones (Review Surface Area)	G-GMD.3	cone pyramid	Surface Area of Pyramids and Cones Common Core: Doctor's Appointment Common Core: Volumes of Compound Objects Activity Common Core: Rolling Cups Activity (Video)
11.8 Surface Areas and Volume of Spheres	G-GMD.3	center chord diameter great circle hemispheres radius sphere	Common Core: Statements about Enlargements Activity Common Core: Volumes of Cylinders, Cones, Pyramids, and Spheres-Page 30
11.9 Explore Similar Solids	G-GMD.3		

Chapter 12: Probability
Timeline: 7 days/Through Day 80

Common Core Standards

S-CP.1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").

S-CP.2. Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

S-CP.7. Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.

S-CP.8. (+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.

S-CP.9. (+) Use permutations and combinations to compute probabilities of compound events and solve problems.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
12.1 Find Probabilities and Odds	S-CP.1	event odds outcome probability sample space	Common Core: Modeling Conditional Probabilities – 1 Activity Common Core: Modeling Conditional Probabilities – 2 Activity Common Core: How Odd?-Page 11
12.2 Find Probabilities Using Permutations	S-CP.9	n factorial permutation	
12.3 Find Probabilities Using Combinations	S-CP.9	combination	
12.4 Find Probabilities of Disjoint and Overlapping Events	S-CP.1 S-CP.7	compound event disjoint or mutually exclusive events	
12.5 Find Probabilities of Independent and Dependent Events	S-CP.2 S-CP.8		

Chapter 9: Properties of Transformations
Timeline: 5 days /Through Day 85

Common Core Standards

N-VM.8. (+) Add, subtract, and multiply matrices of appropriate dimensions.

G-CO.3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

G-CO.5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

G-SRT.1. Verify experimentally the properties of dilations given by a center and a scale factor:

- A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.
- The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
9.1 Translate Figures and Use Vectors	G.C0.5	component form image initial point isometry preimage terminal point translation vector	Vectors Add Vectors Gizmo
9.2 Use Properties of Matrices	N-VM.8(+)	dimensions element matrix	
9.3 Perform Reflections	G-CO.5	reflection	Common Core: Reflected Triangles Reflections
9.4 Perform Rotations	G-CO.5	angle of rotation center of rotation rotation	Rotations
9.5 Apply Compositions of Transformations	G-CO.5	glide reflection	Common Core: Representing and Combining Transformations Activity Common Core: Transformations
9.6 Identify Symmetry	G-CO.3	line of symmetry line symmetry rotational symmetry	Line of Symmetry
9.7 Identify and Perform Dilations	G-SRT.1	dilation enlargement reduction scalar multiplication	Dilations

Depth of Thinking (Webb) + Type of Thinking (Revised Bloom, 2001)	DOK Level 1 Recall & Reproduction	DOK Level 2 Basic Skills & Concepts	DOK Level 3 Strategic Thinking & Reasoning	DOK Level 4 Extended Thinking
Remember	- Recall, locate basic facts, definitions, details, events			
Understand	- Select appropriate words for use when intended meaning is clearly evident	- Specify, explain relationships - summarize – identify central ideas	- Explain, generalize, or connect ideas using supporting evidence (quote, text evidence, example…)	- Explain how concepts or ideas specifically relate to other content domains or concepts
Apply	- Use language structure (pre/suffix) or word relationships (synonym/antonym) to determine meaning	– Use context to identify word meanings - Obtain and interpret information using text features	- Use concepts to solve non-routine problems	- Devise an approach among many alternatives to research a novel problem
Analyze	- Identify the kind of information contained in a graphic, table, visual, etc.	– Compare literary elements, facts, terms, events – Analyze format, organization, & text structures	- Analyze or interpret author's craft (e.g., literary devices, viewpoint, or potential bias) to critique a text	– Analyze multiple sources or texts - Analyze complex/ abstract themes
Evaluate			– Cite evidence and develop a logical argument for conjectures based on one text or problem	- Evaluate relevancy, accuracy, & completeness of information across texts/ sources
Create	- Brainstorm ideas, concepts, problems, or perspectives related to a topic or concept	-Generate conjectures or hypotheses based on observations or prior knowledge and experience	-Develop a complex model for a given situation -Develop an alternative solution	-Synthesize information across multiple sources or texts -Articulate a new voice, alternate theme, new knowledge or perspective

Chapter 1: Equations
Timeline: 13 days

Common Core Standards

A.SSE.1 Interpret expressions that represent a quantity in terms of its context (Modeling standard).

N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.

N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.

Textbook Correlations	2007 SC Standards	Standard	Vocabulary	Resources/Examples
1-1 Variables and Expressions (previously 1-1)	EA 1.1 EA 2.6	A.SSE.1 N.Q.1	Variable Constant Numerical expression Algebraic expression Evaluate	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 1-1 Graphing Calculator Lab Challenge Activity Exploration
1-2 Solving Equations by Adding or Subtracting (previously 3-1)	EA 4.7	A.REI.1 A.REI.3 A.CED.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 1-2 Graphing Calculator lab Challenge Activity

1-3 Solving Equations by Multiplying or Dividing (previously 3-2)	EA 4.7	A.REI.3 A.REI.1 A.CED.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention Challenge Activity
1-4 Solving Two-Step and Multi-Step Equations (previously 3-3)	EA 4.7	A.REI.1 A.REI.3 A.CED.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 1-4 Graphing Calculator Lab Challenge Activity
1-5 Solving Equations with Variables on Both Sides (previously 3-5)	EA 4.7	A.REI.1 A.REI.3 A.CED.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 1-5 Graphing Calculator Lab Challenge Activity
1-6 Solving for a Variable (previously 3-6)	EA 3.7	A.CED.4 A.REI.3 N.Q.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention Challenge Activity
1-7 Solving Absolute-Value Equations (previously 7-6)	EA 4.7	A.CED.1 A.REI.3		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention Challenge Activity

1-8 Rates, Ratios, and Proportions (previously 4-1)	EA 3.8	N.Q.1 A.CED.1 A.REI.3		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 1-8 Graphing Calculator Lab Challenge Activity
1-9 Applications of Proportions (previously 4-2)	EA 3.8	N.Q.1 A.CED.1 A.REI.3		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention 1-9 Graphing Calculator Lab Challenge Activity
1-10 Precision and Accuracy		N.Q.3 N.Q.2		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Challenge Activity

Chapter 2: Inequalities
Timeline: 7 days

Common Core Standards

A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

Textbook Correlations	2007 SC Standards	CCSS	Vocabulary	Resources/Examples
2-1 Graphing and Writing Inequalities (previously 7-1)	EA 4.8 EA 5.12	A.REI.3	Inequality Solution of an inequality	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Challenge Activity
2-2 Solving Inequalities by Adding or Subtracting (previously 7-1)	EA 4.8 EA 5.12	A.REI.3		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 2-2 Graphing Calculator Lab Challenge Activity
2-3 Solving Inequalities by Multiplying and Dividing (previously 7-2)	EA 4.8 EA 5.12	A.REI.3 A.CED.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 2-3 Graphing Calculator Lab Challenge Activity
2-4 Solving Two-Step and Multi-Step Inequalities (previously 7-3)	EA 4.8 EA 5.12	A.REI.3 A.CED.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 2-4 Graphing Calculator Lab Challenge Activity

2-5 Solving Inequalities with Variables on Both Sides (previously 7-3)	EA 4.8 EA 5.12	A.REI.3 A.CED.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 2-5 Graphing Calculator Activity Challenge Activity
2-6 Solving Compound Inequalities (previously 7-4)	EA 4.8 EA 5.12	A.REI.3	Compound inequality Intersection Union Graphing	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention Challenge Activity
2-7 Solving Absolute-Value Inequalities (previously 7-6)	EA 4.8 EA 5.12	A.REI.3 A.CED.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention Challenge Activity

Chapter 3: Functions
Timeline: 7 days

Common Core Standards

F.IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).

F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n + 1) = f(n) + f(n - 1)$ for $n \geq 1$.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

F.BF.1 Write a function that describes a relationship between two quantities.

F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

Textbook Correlations	2007 SC Standards	CCSS	Vocabulary	Resources/Examples
3-1 Graphing Relationships (previously 1-9)	EA 3.4	F.IF.4 N.Q.2	Continuous graph Discrete graph	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 3-1 Graphing Calculator Lab Challenge Activity
3-2 Relations and Functions (previously 5-2 and 5-5)	EA 3.1	F.IF.1 F.IF.5	Relation Domain Range Function	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 3-2 Graphing Calculator Lab Challenge Activity
3-3 Writing Functions (previously 2-9, 5-5, and 5-6)	EA 3.2 EA 3.3	F.IF.2 F.IF.1 F.IF.5 A.CED.3 F.BF.1 F.LE.2	Independent variable Dependent variable Function rule Function notation	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 3-3 Graphing Calculator Lab Challenge Activity
3-4 Graphing Functions (previously 5-3 and 5-4)	EA 5.1	F.IF.5 F.IF.1 F.IF.2 F.IF.7 A.REI.10		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 3-4 Graphing Calculator Lab Challenge Activity
3-5 Scatter Plots and Trend Lines (previously 6-3)	EA 4.4 EA 4.5 DA 3.7	S.ID.6 N.Q.1	Scatter Plot Correlation Positive correlation Negative correlation No correlation Trend line	TI Graphing Calculator Activity Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention

				3-5 Graphing Calculator Lab Challenge Activity
3-6 Arithmetic Sequences (previously 1-2)	IA 6.1 IA 6.2	F.IF.3 F.BF.2 F.LE.2	Sequence Term Ellipsis Arithmetic sequence Common difference	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention Challenge Activity

Chapter 4: Linear Functions
Timeline: 11days

Common Core Standards

A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.

F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

F.BF.1 Write a function that describes a relationship between two quantities.

F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

S.ID.6b Informally assess the fit of a function by plotting and analyzing residuals.

S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.

S.ID.9 Distinguish between correlation and causation.

G.GPE.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line

that passes through a given point).

Textbook Correlations	2007 SC Standard	Standard	Vocabulary	Resources/Examples
4-1 Identifying Linear Functions (previously 5-4)	EA 5.10	A.REI.10 F.IF.7 A.CED.2 F.IF.5 F.LE.2	Linear function Linear equation Standard Form	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention 4-1 Graphing Calculator Lab Challenge Activity
4-2 Using Intercepts (previously 6-4)	EA 5.5	F.IF.7 A.CED.2 A.CED.3 F.IF.2 F.IF.4 F.IF.5	*y*-intercept *x*-intercept Find and graph	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention Challenge Activity
4-3 Rate of Change and Slope (previously 6-1)	EA 5.6 EA 5.7	F.IF.6	Rate of change Rise Run Slope Types of Slope Horizontal change Vertical change	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 4-3 Graphing Calculator Lab Challenge Activity
4-4 The Slope Formula (previously 6-1)	EA 5.6	F.IF.6	Subscripts	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Challenge Activity
4-5 Direct Variation (previously 4-8)	EA 3.5 EA 3.6 EA 3.8	A.CED.2 F.LE.1 F.LE.2 A.CED.3 F.IF.5 F.IF.7	Direct variation Constant of variation	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Challenge Activity

4-6 Slope-Intercept Form (previously 6-4 and 6-5)	EA 4.1 EA 5.1 EA 5.2 EA 5.3 EA 5.10	A.CED.2 A.CED.3 F.IF.7 F.IF.6 F.BF.1 F.LE.2		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 4-6 Graphing Calculator Lab Challenge Activity
4-7 Point-Slope Form (previously 6-2)	EA 4.2 EA 4.3 EA 4.6 EA 4.7 EA 5.4	A.CED.2 A.CED.3 F.IF.7 F.BF.1 F.LE.2		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention 4-7 Graphing Calculator Lab Challenge Activity
4-8 Line of Best Fit (previously 6-3)	EA 4.4 EA 4.5 DA 3.8	S.ID.6 S.ID.6b S.ID.7 S.ID.8 S.ID.9	Residual Least-squares line Line of best fit Linear regression Correlation coefficient	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention Challenge Activity
4-9 Slopes of Parallel and Perpendicular Lines (previously 6-6)	EA 5.8	G.GPE.5 F.IF.7	Parallel lines Perpendicular lines	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention 4-9 Graphing Calculator Lab Challenge Activity
4-10 Transforming Linear Functions (previously 6-5A)	EA 5.2	F.BF.3	Family of functions Parent function Function notation Transformation Translation Rotation Reflection	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention 4-10 Graphing Calculator Lab Challenge Activity

***Optional/If Time Permits**
Chapter 10: Data Analysis and Probability
Timeline: 10 days

Common Core Standards

S.ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).

S.ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

S.ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

S.IC.6 Evaluate reports based on data.

S.CP.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or", "and", "not").

S.CP.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

S.CP.3 Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.

S.CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer

S.CP.6 Find the conditional probability of A given B as the fraction of Bs outcomes that also belong to A, and interpret the answer in terms of the model.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
10-1 Organizing and Displaying Data	S.ID.1	Bar graph Line graph Circle graph	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
10-2 Frequency and Histograms	S.ID.1	Stem-and-leaf plot Frequency Frequency table Histogram Cumulative frequency	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
10-3 Data Distributions	S.ID.2 S.ID.3 S.ID.1	Mean Median Mode Range Outlier First quartile Third quartile	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention

		Interquartile range Box-and-whisker plot	
10-4 Misleading Graphs and Statistics	S.IC.6	Random sample	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
10-5 Experimental Probability	S.CP.1	Experiment Trail Outcome Sample space Event Probability Experimental probability Prediction	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
10-6 Theoretical Probability	S.CP.1	Equally likely Theoretical probability Fair Complement Odds	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
10-7 Independent and Dependent Events	S.CP.2 S.CP.6 S.CP.3 S.CP.5 S.CP.1	Independent events Dependent events	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention

Depth of Thinking (Webb) + Type of Thinking (Revised Bloom, 2001)	DOK Level 1 Recall & Reproduction	DOK Level 2 Basic Skills & Concepts	DOK Level 3 Strategic Thinking & Reasoning	DOK Level 4 Extended Thinking
Remember	- Recall, locate basic facts, definitions, details, events			
Understand	- Select appropriate words for use when intended meaning is clearly evident	- Specify, explain relationships - summarize – identify central ideas	- Explain, generalize, or connect ideas using supporting evidence (quote, text evidence, example…)	- Explain how concepts or ideas specifically relate to other content domains or concepts
Apply	- Use language structure (pre/suffix) or word relationships (synonym/antonym) to determine meaning	– Use context to identify word meanings - Obtain and interpret information using text features	- Use concepts to solve non-routine problems	- Devise an approach among many alternatives to research a novel problem
Analyze	- Identify the kind of information contained in a graphic, table, visual, etc.	– Compare literary elements, facts, terms, events – Analyze format, organization, & text structures	- Analyze or interpret author's craft (e.g., literary devices, viewpoint, or potential bias) to critique a text	– Analyze multiple sources or texts - Analyze complex/ abstract themes
Evaluate			– Cite evidence and develop a logical argument for conjectures based on one text or problem	- Evaluate relevancy, accuracy, & completeness of information across texts/ sources
Create	- Brainstorm ideas, concepts, problems, or perspectives related to a topic or concept	-Generate conjectures or hypotheses based on observations or prior knowledge and experience	-Develop a complex model for a given situation -Develop an alternative solution	-Synthesize information across multiple sources or texts -Articulate a new voice, alternate theme, new knowledge or perspective

Chapter 5: Systems of Equations and Inequalities
Timeline: 8 days

Common Core Standards

A.REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.

A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

Textbook Correlations	2007 SC Standard	Standard	Vocabulary	Resources/Examples
5-1 Solving Systems by Graphing (previously 8-1)	EA 4.9 EA 5.11	A.REI.6 A.REI.11 A.CED.2 A.CED.3	System of linear equations Solution of a system of linear equations	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
5-2 Solving Systems by Substitution (previously 8-2)	EA 4.10 EA 5.11	A.REI.6 A.CED.3		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention

5-3 Solving Systems by Elimination (previously 8-3 and 8-4)	EA 4.10 EA 5.11	A.REI.5 A.REI.6 A.CED.3		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
5-4 Solving Special Systems (previously 8-1, 8-2, 8-3, 8-4)	EA 4.9 EA 4.10 EA 5.11	A.REI.6 A.CED.2 A.CED.3	Consistent system Inconsistent system Independent system Dependent system	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
5-5 Solving Linear Inequalities (previously 7-8)	EA 4.8 EA 5.12	A.REI.12 A.CED.3	Linear inequality Solution of a linear inequality	 Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
5-6 Solving Systems of Linear Inequalities (previously 8-5)	IA 2.2 IA 2.3	A.REI.12 A.CED.3	System of linear inequalities Solutions of a system of linear inequalities	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention

Chapter 6: Exponents and Polynomials
Timeline: 7 days

Common Core Standards

N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define 51/3 to be the cube root of 5 because we want (51/3)3 = 5(1/3)3 to hold, so (51/3)3 must equal 5.

N.RN.2 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define 51/3 to be the cube root of 5 because we want (51/3)3 = 5(1/3)3 to hold, so (51/3)3 must equal 5.

A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients.

A.APR.1 Interpret parts of an expression, such as terms, factors, and coefficients.

Textbook Correlations	2007 SC Standard	Standard	Vocabulary	Resources/Examples
Honors Algebra I 7-1	EA 2.2 EA 2.7	N.RN.1	Zero exponent Negative exponent Quotient Rule	
Honors Algebra I 7-2 and 7-3	EA 2.2 EA 2.7 IA 4.5	N.RN.1 N.RN.2	Index	
6-3 Polynomials	EA 2.7	A.SSE.1a	Monomial Degree of a monomial Polynomial Degree of a polynomial Standard form of a polynomial Leading coefficient Quadratic Cubic Binomial Trinomial	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention SMART
6-4 Adding and Subtracting Polynomials	EA 2.7	A.APR.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
6-5 Multiplying Polynomials	EA 2.7	A.APR.1		Review Properties of Exponents Student Practice Quiz Practice B Worksheet Problem Solving Worksheet

				Skills Intervention Problem Solving Intervention
6-6 Special Products of Binomials	EA 2.7	A.APR.1	Perfect-square trinomial Difference of two squares	 Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention

Chapter 7: Factoring Polynomials **Timeline: 7 days**
Common Core Standards
A.SSE.2 Interpret parts of an expression, such as terms, factors, and coefficients.

Textbook Correlations	2007 SC Standard	Standard	Vocabulary	Resources/Examples
7-1 Factors and Greatest Common Factors		A.SSE.2	Prime factorization Greatest common factor	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
7-2 Factoring by GCF	EA 2.8	A.SSE.2		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
7-3 Factoring x^2+bx+c	EA 2.8	A.SSE.2	Guess and check	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
7-4 Factoring ax^2+bx+c	EA 2.8	A.SSE.2		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
7-5 Factoring Special Products	EA 2.8	A.SSE.2	Perfect square trinomial Difference of squares	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
7-6 Choosing a Factoring Method	EA 2.8	A.SSE.2		SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention

Chapter 8: Quadratic Functions and Equations
Timeline: 9 days

Common Core Standards

A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

F.BF.1 Write a function that describes a relationship between two quantities.

F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

A.REI.4 Solve quadratic equations in one variable.

A.REI.4a Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)2 = q$ that has the same solutions Derive the quadratic formula from this form.

A.REI.4b Solve quadratic equations by inspection (e.g., for $x2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.

A.REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = –3x$ and the circle $x2 + y2 = 3$.

A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

Textbook Correlations	2007 SC Standard	Standard	Vocabulary	Resources/Examples
8-1 Identifying Quadratic Functions	EA 6.1	F.IF.7 A.REI.10	Quadratic function Parabola Vertex Minimum Maximum	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
8-2 Characteristics of Quadratic Functions	EA 6.5	F.IF.7 F.IF.8 F.IF.4	Zero of a function Axis of symmetry	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
8-3 Graphing Quadratic Functions	EA 6.5	F.IF.7 F.IF.4 F.IF.8		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
8-4 Transforming Quadratic Functions	EA 6.1 EA 6.2 EA 3.5	F.BF.3 F.IF.7 F.IF.5		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
8-5 Solving Quadratic Equations by Graphing	EA 6.5	A.REI.11 A.REI.4 F.IF.7 F.IF.5	Quadratic equation Solve by graphing	SMART Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention

8-6 Solving Quadratic Equations by Factoring	EA 6.4	A.REI.4b A.SSE.3	Zero product property	SMART. Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
8-7 Solving Quadratic Equations by Using Square Roots	EA 2.2	A.REI.4b A.CED.3 A.CED.1 F.BF.1		SMART. Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
8-8 Completing the Square	IA 3.3	A.REI.4a A.CED.1	Completing the square	SMART. Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
8-9 The Quadratic Formula and the Discriminant	IA 3.3	A.REI.4b A.REI.4a A.REI.1	Discriminant	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention
8-10 Nonlinear Systems	IA 2.11	A.REI.7	Nonlinear system of equations	SMART. Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention

***Optional/If Time Permits**
Chapter 9: Exponential Functions
Timeline: 7 days

Common Core Standards

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n + 1) = f(n) + f(n - 1)$ for $n \geq 1$.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

F.IF.7e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.

F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.

F.BF.1 Write a function that describes a relationship between two quantities.

F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

Textbook Correlations	2007 SC Standard	Standard	Vocabulary	Resources/Examples
9-1 Geometric Sequences	IA 6.1 IA 6.2	F.IF.3 F.LE.2 F.BF.2	Geometric sequence Common ratio	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention

				Problem Solving Intervention
9-2 Exponential Functions	IA 4.14	F.IF.7e F.LE.1 F.IF.4 F.IF.8 A.REI.10	Exponential functions	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
9-3 Exponential Growth and Decay	IA 4.4	F.LE.2 F.LE.5 F.LE.1 F.BF.1	Exponential growth Compound interest Exponential decay Half-life	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
9-4 Linear, Quadratic, and Exponential Models	IA 4.4	F.LE.1 F.LE.2 A.CED.2 F.IF.4 F.IF.7 F.BF.1		Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention
9-5 Comparing Functions		F.IF.9 F.IF.6 F.LE.3	Average rate of change	Student Practice Quiz Practice B Worksheet Problem Solving Worksheet Skills Intervention Problem Solving Intervention

Chapter 1: Foundations for Geometry
Timeline: 7 days

Common Core Standards

G-CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G-CO.2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

G-CO.3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

G-CO.4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

G-CO.5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

G-CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.*

A-SSE.1. Interpret expressions that represent a quantity in terms of its context.★

- Interpret parts of an expression, such as terms, factors, and coefficients.
- Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.*

A-CED.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*

G-GPE.7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.★

Textbook Correlations	Standard	Vocabulary	Resources/Examples
1-1 Understanding Points, Lines, and Planes	G-CO.1	collinear coplanar endpoint line opposite ray plane point postulate ray segment	Points, Lines and Planes Interactive Applet

		undefined term	
1-2 Measuring and Constructing Segments	G-CO.12	between bisect congruent segments construction coordinate distance length midpoint segment bisector	Segment Addition Postulate
1-3 Measuring and Constructing Angles	G-CO.1 G-CO.12	acute angle angle angle bisector congruent angle degree exterior of an angle interior of an angle measure obtuse angle right angle straight angle vertex	Common Core: Challenges from Ancient Greece-Page 40 Constructions-With printable worksheets Angle Measure with a Protractor Angle Bisector Performing Constructions
1-4 Pairs of Angles	G-CO.1	adjacent angles complementary angles linear pair supplementary angles vertical angles	Adjacent Angles Gizmo 1 Adjacent Angles Gizmo 2 Angle Relationships
1-5 Using Formulas in Geometry	A-SSE.1 A-CED.4	area base circumference diameter height perimeter pi radius	
1-6 Midpoint and Distance in the Coordinate Plane	G-GPE.7	coordinate plane hypotenuse leg	Distance Distance Gizmo Distance between two points Midpoint of a line segment (Midpoint Theorem)
1-7 Transformations in the Coordinate Plane	G-CO.2 G-CO.4 G-CO.5	image pre-image reflection	Common Core: An Interactive Introduction to Transformational Geometry Translations

		rotation transformation translation	Rotations Reflections Rotations, Reflections, Translations Gizmo
9-5 Symmetry	G-CO.2 G-CO.3 G-CO.5	symmetry line symmetry line of symmetry rotational symmetry	Line of Symmetry

Chapter 2: Geometric Reasoning
Timeline: 8 days/Through Day 15

Common Core Standards

G-CO.9. Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*

G-CO.10. Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*

G-CO.11. Prove theorems about parallelograms. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*

G-SRT.4. Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*

Textbook Correlations	Standard	Vocabulary	Resources/Examples
2-1 Using Inductive Reasoning to Make Conjectures	G-CO.9 G-CO.10 G-CO.11 G-SRT.4	conjecture counterexample inductive reasoning	Inductive Reasoning
2-2 Conditional Statements	G-CO.9 G-CO.10 G-CO.11 G-SRT.4	conclusion conditional statement contrapositive converse hypothesis inverse logically equivalent statements negation truth value	Conditionals Gizmo
2-3 Using Deductive Reasoning to Verify Conjectures	G-CO.9 G-CO.10 G-CO.11 G-SRT.4	deductive reasoning	Deductive Reasoning Activity
2-5 Algebraic Proof	G-CO.9 G-CO.10 G-CO.11 G-SRT.4	proof	Properties of Algebra-Flashcards Writing Proofs

Chapter 3: Parallel and Perpendicular Lines
Timeline: 6 days/Through Day 21

Common Core Standards

G-CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G-CO.9. Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*

G-CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.*

G-GPE.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

Textbook Correlations	Standard	Vocabulary	Resources/Examples
3-1 Lines and Angles	G-CO.1	alternate exterior angles alternate interior angles corresponding angles parallel lines parallel planes perpendicular lines same-side interior angles skew lines transversal	Investigate Lines and Planes
3-2 Angles Formed by Parallel Lines and Transversals	G-CO.9 G-CO.12		Definition of parallel lines Transversal Corresponding angles Alternate interior angles Alternate exterior angles Interior angles of a transversal Exterior angles of a transversal
3-3 Proving Lines Parallel	G-CO.9 G-CO.12 G-GPE.5		Common Core: Lunch Lines-Page 29
3-4 Perpendicular Lines	G-CO.9 G-CO.12	distance from a point to a line perpendicular bisector	
3-5 Slopes of Lines	G-GPE.5	rise run slope	Slope review

3-6 Lines in the Coordinate Plane	G-GPE.5	point-slope form slope-intercept form	Graphical Linear Function Explorer Slope (m) of a line Intercept (b) of a line Equation of a line in slope-intercept form Equation of a line in point-slope form Common Core: Equations of Parallel & Perpendicular Lines Activity Common Core: Constructing Parallel and Perpendicular Lines-Page 46

Chapter 4: Triangle Congruence
Timeline: 9 days/Through Day 30

Common Core Standards

G-CO.6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

G-CO.7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

G-CO.8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

G-CO.10. Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*

G-SRT.5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

G-MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★

Textbook Correlations	Standard	Vocabulary	Resources/Examples
4-1 Congruence and Transformations	G-CO.6 G-CO.7	dilation isometry	Dilations Dilations
4-2 Classifying Triangles	G-CO.10	acute triangle equiangular triangle equilateral triangle isosceles triangle obtuse triangle right triangle scalene triangle	Triangle definition Acute Obtuse Isosceles Scalene Equilateral Right triangle
4-3 Angle Relationships in Triangles	G-CO.10	auxiliary line corollary exterior exterior angle interior interior angle remote interior angle	Triangle Angle Sum Internal angles Exterior angles
4-4 Congruent Triangles	G-SRT.5	congruent polygons corresponding angles corresponding sides	Numerical Applications
4-5 Triangle Congruence: SSS and SAS (Proofs are optional)	G-CO.7 G-CO.8 G-SRT.5	included angle triangle rigidity	SSS Congruent Triangles Common Core: Why does SAS work? SAS Congruent Triangles

4-6 Triangle Congruence: ASA, AAS, and HL (Proofs are optional)	G-CO.7 G-CO.8 G-SRT.5	included side	Hypotenuse-Leg Thm Common Core: Are the Triangles Congruent? Common Core: Proving Two Triangles are Congruent-Page 52 AAS Congruent Triangles ASA Congruent Triangles AAA Proving Congruence Gizmo
4-7 Triangle Congruence: CPCTC (Proofs are optional)	G-SRT.5 G-MG.3*	CPCTC	Congruent Triangles Common Core: Triangle Proofs-Page 55
4-9 Isosceles and Equilateral Triangles (Proofs are optional)	G-CO.10	base legs of an isosceles triangle vertex angle	Isosceles and Equilateral Triangles Gizmo Isosceles Triangle

Chapter 5: Properties and Attributes of Triangles
Timeline: 6 days/Through Day 36

Common Core Standards

G-C.3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle

G-CO.9. Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*

G-CO.10. Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*

G-CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.*

G-SRT.4. Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*

G-MG.2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).★

G-MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★

Textbook Correlations	Standard	Vocabulary	Resources/Examples
5-1 Perpendicular and Angle Bisectors	G-CO.9 G-SRT.4	equidistant locus	Perpendicular Bisector
5-2 Bisectors of Triangles	G-C.3 G-CO.12 G-MG.2*	circumcenter of a triangle circumscribed concurrent incenter of a triangle inscribed point of concurrency	Circumcenter Incenter Common Core: Inscribing and Circumscribing Right Triangles Activity
5-3 Medians and Altitudes of Triangles	G-CO.10 G-CO.12 G-MG.3*	altitude of a triangle centroid of a triangle median of a triangle orthocenter of a triangle	Common Core: Centers of Triangles-Page 60 Median Median of a triangle definition Euler Line Special Points and Euler Line Centroid Orthocenter Concurrence Gizmo
5-4 The Triangle Midsegment Theorem	G-CO.10	midsegment of a triangle	Midsegment Practice with Midsegments

5-5 Indirect Proof and Inequalities in One Triangle (Triangle Inequalities only)	G-CO.10	indirect proof	Indirect Proofs Triangle Inequalities Triangle Inequality Gizmo
5-6 Inequalities in Two Triangles	G-CO.10		Hinge Theorem

Chapter 6: Polygons and Quadrilaterals
Timeline: 7 days/Through Day 43

Common Core Standards

G-CO.11. Prove theorems about parallelograms. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*

G-GPE.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

G-MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★

G-SRT.5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
6-1 Properties and Attributes of Polygons	G-CO.11	concave convex diagonal regular polygon side of a polygon vertex of a polygon	Common Core: Constructions Inscribed in a Circle-Page 48 Polygon Capture Polygon Angles Interior Angles of Quadrilateral Exterior Angles of Quad Interior Angles of Pentagon Exterior Angles of Pentagon Interior Angles of Hexagon Exterior Angles of Hexagon
6-2 Properties of Parallelograms	G-CO.11	parallelogram	Common Core: Midpoints of the Sides of a Parallelogram Parallelograms Explore the Parallelogram
6-3 Conditions for Parallelograms	G-CO.11 G-GPE.5 G-MG.3		
6-4 Properties of Special Parallelograms	G-CO.11	rectangle rhombus square	Common Core: Proving Quadrilaterals in the Coordinate Plane-Page 68 Rhombus Properties Rectangle Properties Square Properties Explore the Rhombus Explore the Rectangle
6-5 Conditions for Special Parallelograms	G-CO.11		
6-6 Properties of Kites and Trapezoids	G-SRT.5	base angle of a trapezoid base of a trapezoid isosceles trapezoid kite	Common Core: Constructing with Diagonals-Page 63 Kite Properties Explore the Isosceles Trapezoid Proofs using Coordinate Geometry

		leg of a trapezoid midsegment of a trapezoid trapezoid	Analytic Proofs using Slope and Distance

Chapter 7: Similarity
Timeline: 9 days/Through Day 52

Common Core Standards

G-C.1. Prove that all circles are similar.

G-SRT.1. Verify experimentally the properties of dilations given by a center and a scale factor:

- A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.
- The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

G-SRT.2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

G-SRT.3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

G-SRT.4. Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*

G-SRT.5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

G-MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).***G-SRT.5.** Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
7-1 Ratios in Similar Polygons	G-SRT.2 G.MG.3*	similar similar polygons similarity ratio	Similarity in Polygons Gizmo Similar Figures Gizmo A
7-2 Similarity and Transformations	G-C.1 G-SRT.1		Common Core: Similarity in the Coordinate Plane-Page 15 Similar Triangles
7-3 Triangle Similarity: AA, SSS, and SAS (Proofs are optional)	G-SRT.2 G-SRT.3 G-SRT.4		Common Core: Floodlights Activity Similar triangles test - three angles the same (AAA) Common Core: Are They Similar? Common Core: Similar Triangles-Page 18 Common Core: Proving Similar Triangles-Page 21 Similar triangles test - three sides in proportion (SSS) Similar triangles test - two sides in proportion, included angle equal (SAS)
7-4 Applying Properties of Similar Triangles	G-SRT.2 G-SRT.4 G-SRT.5		Common Core: Shadow Math-Page 20 Similar triangles - ratio of parts Similar triangles - ratio of areas Similar Triangles Applet

7-5 Using Proportional Relationships	G-SRT.5	indirect measurement scale scale drawing	

Chapter 8: Right Triangles and Trigonometry
Timeline: 10 days/Through Day 62

Common Core Standards

G-SRT.4. Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*

G-SRT.6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

G-SRT.8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.★

Textbook Correlations	Standard	Vocabulary	Resources/Examples
5-7 The Pythagorean Theorem	G-SRT.4 G-SRT.8	pythagorean triple	Common Core: The Pythagorean Theorem – Square Areas Activity Common Core: Proofs of the Pythagorean Theorem Activity Common Core: Pythagorean Theorem using Triangle Similarity-Page 25 Pythagoras' Theorem 3-4-5 triangle Pythagorean triples
5-8 Applying Special Right Triangles	G-SRT.6		Common Core: Discovering Special Triangles-Page 16 30-60-90 triangle 45-45-90 triangle
8-2 Trigonometric Ratios	G-SRT.6	cosine sine tangent trigonometric ratio	Trig RAP-Gettin' Triggy Wit It Common Core: Find That Side or Angle-Page 29 Sine and Cosine Gizmo Sine, Cosine and Tangent Gizmo
8-3 Solving Right Triangles	G-SRT.8		Common Core: Finding Right Triangles in Your Environment-Page 20 Common Core: Create Your Own Triangles-Page 22 Common Core: Discovering Trigonometric Ratio Relationships-Page 27
8-4 Angles of Elevation and Depression	G-SRT.8	angle of depression angle of elevation	Angle of Elevation and Depression Applet

Chapter 11: Three Dimensional Figures and Volume
Timeline: 5 Days/Through Day 67

Common Core Standards

G-GMD.1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.*

G-GMD.3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★

G-GMD.4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

G-MG.1. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★

G-MG.2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).★

Textbook Correlations	Standard	Vocabulary	Resources/Examples
11-1 Solid Geometry	G-GMD.4	cone cross section cube cylinder edge face net prism pyramid vertex	Surface Area of Pyramids and Cones Common Core: Doctor's Appointment Common Core: Volumes of Compound Objects Activity Common Core: Rolling Cups Activity (Video)
11-2 Volumes of Prisms and Cylinders (Review Surface Area)	G-GMD.1 G-GMD.3 G-MG.1 G-MG.2	volume	Surface Area of Prisms and Cylinders Surface and Lateral Area Gizmo Surface Area Gizmo Cubes
11-3 Volumes of Pyramids and Cones (Review Surface Area)	G-GMD.1 G-GMD.3		Surface Area of Pyramids and Cones Common Core: Doctor's Appointment Common Core: Volumes of Compound Objects Activity Common Core: Rolling Cups Activity (Video)
11-4 Spheres	G-GMD.3	center of a sphere great circle hemisphere radius of a sphere sphere	Common Core: Statements about Enlargements Activity Common Core: Volumes of Cylinders, Cones, Pyramids, and Spheres-Page 30

Chapter 13: Probability
Timeline: 6 Days/Through Day 73

Common Core Standards

S-CP.1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").

S-CP.2. Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

S-CP.3. Understand the conditional probability of *A* given *B* as *P*(*A* and *B*)/*P*(*B*), and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*.

S-CP.4. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. *For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.*

S-CP.5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. *For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.*

S-CP.6. Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong to *A*, and interpret the answer in terms of the model.

S-CP.7. Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.

S-CP.9. (+) Use permutations and combinations to compute probabilities of compound events and solve problems.

S-IC.2. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. *For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?*

S-ID.5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

S-MD.7. (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

Textbook Correlations	Standard	Vocabulary	Resources/Examples
13-1 Permutations and Combinations	S-CP.9	combination factorial fundamental counting principle permutation	

13-2 Theoretical and Experimental Probability	S-MD.7	complement equally likely outcomes event experiment experimental probability favorable outcomes geometric probability outcome probability sample space theoretical probability trial	
13-3 Independent and Dependent	S-CP.2 S-CP.3 S-CP.4 S-CP.6 S-IC.2 S-ID.5	conditional probability dependent events independent events	Common Core: Modeling Conditional Probabilities –1 Common Core: Modeling Conditional Probabilities – 2 Common Core: How Odd?-Page 11
13-4 Two-Way Tables	S-CP.4 S-CP.5 S-CP.6	conditional relative frequency joint relative frequency marginal relative frequency	
13-5 Compound Events	S-CP.1 S-CP.7	compound event inclusive events mutually exclusive events simple event	

***Optional/If Time Permits**
Chapter 9: Extending Transformational Geometry
Timeline: 5 days/Through Day 78

Common Core Standards

G-CO.2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

G-CO.4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

G-CO.5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

G-CO.6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

G-SRT.1. Verify experimentally the properties of dilations given by a center and a scale factor:

- A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.
- The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
9-1 Reflections	G-CO.2 G-CO.4 G-CO.5 G-CO.6	isometry	Common Core: Reflected Triangles Reflections
9-2 Translations	G-CO.2 G-CO.4 G-CO.5 G-CO.6		
9-3 Rotations	G-CO.2 G-CO.4 G-CO.5 G-CO.6		Rotations
9-4 Composition of Transformations	G-CO.2 G-CO.4 G-CO.5 G-CO.6	glide reflection	Common Core: Representing and Combining Transformations Activity Common Core: Transformations
9-6 Tessellations	G-CO.2 G-CO.5	translation symmetry frieze pattern glide reflection symmetry tessellation	

		regular tessellation semiregular tessellation	
9-7 Dilation	G-CO.2 G-SRT.1	center of dilation enlargement reduction	

***Optional/If Time Permits**
Chapter 12: Circles
Timeline: 8 days/Through Day 86

Common Core Standards

G-C.2. Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle*.

G-C.3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

G-C.4. (+) Construct a tangent line from a point outside a given circle to the circle.

G-C.5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

G-CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.*

G-CO.13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

G-GPE.1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation

Textbook Correlations	Standard	Vocabulary	Resources/Examples
12-1 Lines That Intersect Circles	G-C.2 G-C.4 G-CO.12	chord common tangent concentric circles congruent circles exterior of a circle interior of a circle point of tangency secant tangent circles tangent of a circle	Circle Basics
12-2 Arcs and Chords	G-C.2 G-CO.12	adjacent arcs arc central angle congruent arcs major arc minor arc semicircle	Common Core: Circles and their Relationships among Central Angles, Arcs, and Chords-Page 9 Arcs and Angles Chords and Arcs Gizmo
12-3 Sector Area and Arc Length	G-C.5	Arc length Segment of a circle	Common Core: Circles and Triangles Activity Common Core: Arc Length and Area of a Sector-Page 24

			Circumference and Area Gizmo Area of a Sector
12-4 Inscribed Angle	G-C.2 G-C.3 G-CO.12 G-CO.13	inscribed angle intercepted arc subtend	Inscribed Angle Inscribed Angles and Arcs Gizmo Inscribed Angle Interactive Practice Inscribed Quadrilateral
12-5 Angle Relationships in Circles	G-C.2		Common Core: Two Wheels and a Belt Common Core: Investigating Angle Relationships in Circles-Page 13 Angles in Circles Sketchpad Tangents Constructing a tangent to a circle Two chords angle Two chords angle Practice Two secants angle Two secants angle Practice
12-6 Segment Relationships in Circles	G-C.2	external secant segment secant segment tangent segment	Common Core: Chords, Secants, and Tangents-Page 17 Segments
12-7 Circles in the Coordinate Plane	G-PE.1		Common Core: Equations of Circles 1 Activity Common Core: Equations of Circles 2 Activity Common Core: Deriving the General Equation of a Circle-Page 10 Equation of Circle

***Optional/If Time Permits**
Chapter 10: Extending Perimeter, Circumference, and Area
Timeline: 4 days/Through Day 90

Common Core Standards

A-SSE.1. Interpret expressions that represent a quantity in terms of its context.★

- Interpret parts of an expression, such as terms, factors, and coefficients.
- Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret* $P(1+r)^n$ *as the product of P and a factor not depending on P.*

A-CED.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*

G-GMD.1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.*

G-MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★

G-GPE.7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.★

S-CP.1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").

Textbook Correlations	Standard	Vocabulary	Resources/Examples
10-1 Developing Formulas for Triangles and Quadrilaterals	A-SSE.1 A-CED.4		
10-2 Developing Formulas for Circles and Regular Polygons	G-GMD.1	circle center of a circle center of a regular polygon apothem central angle of a regular polygon	Circumference vs. Diameter Computing Pi Area of Regular Polygons
10-3 Composite Figures	G-MG.3	composite figure	
10-4 Perimeter and Area in the Coordinate Plane	G-GPE.7		
10-6 Geometric Probability	S-CP.1	geometric probability	Geometric Probability Gizmo

This website can be used for multiple chapters for activities:
http://apstatsmonkey.com (currently under construction)
***Textbook for CP Stats: Elementary Statistics a step by step approach 8th edition**

Concept: Introduction to Statistics (Chapter 1 and 14) **Timeline: 12 days**
2007 Standard(s): **Standard DA-1: The student will use the mathematical process of representation, connection, communication, reasoning and proof, and problem solving.** DA-1.2 Execute procedures to find measures of probability and statistics using tools such as hand-held computing devices, spreadsheets, and statistical software. DA-1.4 Design and conduct a statistical research project, produce a report, and summarize the findings DA-1.6 Communicate knowledge of data analysis and probability using mathematical terminology appropriately. **Standard DA-2: The student will demonstrate through the mathematical processes an understanding of the design of a statistical study.** DA-2.1 Classify a data collection procedure as a survey, an observational study, or a controlled experiment DA-2.2 Compare various random sampling techniques (including simple, stratified, cluster, and systematic). DA-2.3 Analyze a data-collection procedure to classify the technique used as either simple cluster, systematic, or convenience sampling. DA-2.4 Critique data collection methods and describe how bias can be controlled or reduced DA-2.5 Judge which of two or more possible experimental designs will best answer a given research question DA-2.6 Generate a research question and design a statistical study to answer the research question **Standard DA-4: The student will demonstrate through the mathematical processes an understanding of basic statistical methods of analyzing data.** DA-4.2 Compare descriptive and inferential statistics. DA-4.3 Classify a variable as discrete or continuous and as either categorical or quantitative.

Textbook Section	Standard	Vocabulary	Resources/examples

1.1 Descriptive and Inferential Statistics 1.2 Variables and Types of Data 1.3 Data collection and sample techniques 1.4 Observational and experimental studies 1.5 Uses and misuses of statistics 1.6 Computers and calculators 14.1 Common Sampling techniques 14.2 Surveys and Questionnaire design 14.3 Simulation Techniques	DA-1.2 DA-1.6 DA-2.1 DA-2.2 DA-2.3 DA-2.4 DA-2.5 DA-2.6 DA-4.2 DA-4.3	Cluster sample Confounding variable Continuous variable Control group Convenience sample Data Data set Data value or datum Dependent variable Descriptive statistics Discrete variable, Experimental study Explanatory variable Hawthorne effect Hypothesis testing Independent variable Inferential statistics Interval level of measurement Measurement scale Nominal level of measurement Observational study Ordinal level of measurement Outcome variable Population Probability Qualitative variable Quantitative variable Quasi-experimental study Random sample Random variable Ratio level of measurement Sample Statistics Stratified sample Systematic sample Treatment group	The POWERMUTT Project This website contains notes for students who may need extra help. Who Am I? - Collect the data first week of school. Use the information as an ice breaker. Have the students keep the data sheets they used the first day for this activity. Cookie lab Statistics Tutorial: Simple Random Sampling – can be used for students who are having trouble with this section Data Collection-Census http://nnlm.gov/evaluation/workshops/measuring_your_impact/DataCollectionHandout.pdf http://www.prm.nau.edu/prm447/methods_of_data_collection_lesson.htm Example: A statistics student at Grand Morris State College found that of the 1260 adults surveyed that lived near the college, 44.8% of them ate in fast-food restaurants from one to two times a week A. Is the variable quantitative or qualitative? B. Would this be considered an example of descriptive or inferential statistics? C. What is the implied population? Example: Discuss which technique of data collection you think was used in the following study and comment on how believe the study controlled possible bias. A. An ecology class used binoculars to watch 20

		Variable	turtles at Rowland Pond. It was found that 15 were box turtles and five were snapping turtles. B. The New York State division of Wildlife caught 21 male deer (put a monitor on them) and gave each one an injection to prevent heart worm. A year later 13 of the 15 deer they recaptured did not have heartworms, while the others did.

Concept: Organizing Data (Chapter 2)
Timeline: 10 days

Standard:

Standard DA-1: The student will use the mathematical process of representation, connection, communication, reasoning and proof, and problem solving.

DA-1.7 Judge the reasonableness of solutions based on the source of the data, the design of the study, the way the data is displayed, and the way the data is analyzed

DA-1.8 Compare data sets using graphs and summary statistics

Standard DA-3: The student will demonstrate through the mathematical processes an understanding of the methodology for collecting, organizing, displaying, and interpreting data

DA-3.2 Organize and interpret data by using pictographs, bar graphs, pie charts, dot plots, histograms, time-series plots, stem-and-leaf plots, box-and-whiskers plots, and scatter plots.

DA-3.3 Select appropriate graphic display(s) from among pictographs, bar graphs, pie charts, dot plots, histograms, time-series plots, stem-and-leaf plots, box-and-whiskers plots, and scatter plots when given a data set or problem situation.

DA-3.4 Represent frequency distributions by using displays such as categorical frequency distributions/Pareto charts, histograms, frequency polygons, and cumulative frequency distributions/ogives.

Standard DA-4: Through the process standards the student will demonstrate an understanding of basic statistical methods of analyzing

data.

DA-4.8 Classify a distribution as symmetric, positively skewed, or negatively skewed.
DA-4.9 Explain the significance of the shape of the distribution

Textbook Sections	Standard	Vocabulary	Resources/Examples
2.1 Organizing Data 2.2 Histograms, Frequency Polygons, and Ogives 2.3 Other types of graphs	DA-1.7 DA-1.8 DA-3.2 DA-3.3 DA-3.4 DA-4.8 DA-4.9	Bar graph Categorical frequency distribution Class Class boundaries Class midpoint Class width Cumulative frequency Cumulative frequency distribution Frequency Frequency distribution Frequency polygon Grouped frequency distribution Histogram Lower class limit Ogive Open-ended distribution Pareto chart Pie graph Raw data Relative frequency graph Stem and leaf plot Time series graph Ungrouped frequency distribution Upper class limit	Baseball_Stats Data http://www.november.org/graphs/ This site contains numerous graphs about the prison systems. Don't use the "State by State Corrections" link. The page has moved! http://www.infoplease.com/edu/colleges/sc.html Use different graphical representations to illustrate various segments of the data. Tools for Displaying Data http://wiki.stat.ucla.edu/socr/index.php/SOCR_Data_Dinov_020108_HeightsWeights Data: 25,000 heights and weights Example: *Fortunate* magazine reported some interesting housekeeping secretes. When unexpected company comes, where do we hide the mess? 68% respondents toss their mess in the closet, 23% shove things under the bed, 6% put things in the bathtub, and 3% put the mess in the freezer. Make a circle graph and/or ogive to display this information. Example: The heights at different ages of boys change as they get older. Construct a time-series plot using the following data: Age (years): 3 4 5 6 7

			Height (in.): 36 39 42 45 47 Age (years): 8 9 10 11 12 Height (in.): 50 52 54 56 58

Concept: Averages and Variation (Chapter 3)
Timeline: 10 days

Standards:

Standard DA-1: The student will use the mathematical process of representation, connection, communication, reasoning and proof, and problem solving.

DA-1.5: Apply the principles of probability and statistics to solve problems in real-world contexts

Standard DA-4: The student will demonstrate through the mathematical processes an understanding of basic statistical methods of analyzing data.

DA-4.4: Use procedures and/or technology to find measures of central tendency (mean, median, mode) for given data
DA-4.5: Predict the effect of transformations of data on measures of central tendency, variability, and the shape of the distribution
DA-4.6: Use procedures and/or technology to find measures of spread (range, variance, standard deviation, interquartile range, and outliers) for given data
DA-4.7: Use procedures and/or technology to find measures of position (including median, quartiles, percentiles, standard scores) for given data
DA-4.8: Classify a distribution as symmetric, positively skewed, or negatively skewed
DA-4.11: Use control charts to determine if a process is in control

Textbook Section	Standard	Vocabulary	Resources / Examples

3.1 Measures of central tendency 3.2 Measures of variation 3.3 Measures of position 3.4 Exploratory data analysis	DA-1.5 DA-4.4 DA-4.5 DA-4.6 DA-4.7 *DA-4.11 control chart	Bimodal Boxplot Chebyshev's Theorem Coefficient of variation Data array Decile Empirical rule Exploratory data analysis (EDA) Five-number summary Inter-quartile range (IQR) Mean Median Mode Midrange Modal class Multimodal Negatively skewed or left-skewed Outlier Parameter Percentile Positively or right-skewed Quartile Range Range rule of thumb Resistant statistic Standard deviation Statistic Symmetric distribution Unimodal Variance Weighted mean z-score or standard score	Mean, Median, Mode, Range Data Practice (Learning Check) HSAP practice with TI Navigator The Fujita Scale Baseball Data http://wiki.stat.ucla.edu/socr/index.php/SOCR_Data_Dinov_020108_HeightsWeights http://www.nku.edu/~statistics/212_Using_the_Empirical_Rule.htm http://www.regentsprep.org/regents/math/algebra/AD3/boxwhisk.htm Example: The annual salaries for 11 people who work at Beanbridge National Bank are listed below. (in thousands of dollars) A. Compute the mean, median and mode of all 11 salaries. B. Omit the salaries of the president and vice president. Calculate the mean and median for the remaining 9 people. C. Which measure of central tendency best describes salaries at Beanbridge bank. President: 90 Vice President: 80 Tellers: 15, 25, 18, 22, 18, 19, 20, Secretaries: 13, 14 Example: Compute the sample mean, sample variance,

			sample standard deviation for the mortality rate of trout caught and released using artificial flies with barbed hook based on data collected from regions in Montana, New York, Illinois, Wyoming, Utah: Percent Mortality: 2.9 6.3 1.8 Number of Fish: 145 270 224 Percent Mortality: 4.7 3.2 Number of Fish: 271 69

Concept: Probability Theory (Chapter 4)
Timeline: 15 days

Standard:

Standard DA-1: The student will use the mathematical processes of representation, connection, communication, reasoning and proof, and problem solving.

DA-1.1: Execute procedures to conduct simple probability experiments and collect data using manipulatives including spinners, dice, cards, and coins.

DA-1.3: Execute procedures to conduct a simulation using random number tables and/or technology including hand-held computing devices and computers.

Standard DA-3: The students demonstrate an understanding of how to collect, organize, display, and interpret data.

DA-3.1: Use manipulatives, random number tables, and technology to collect data and conduct experiments and simulations.

Standard DA-4: The student will demonstrate an understanding of basic statistical methods of analyzing data.

DA-4.10: Use knowledge of Empirical Rule to solve problems involving data that is normally distributed.

Standard DA-5: The student will demonstrate through the mathematical processes an understanding of the basic concepts of probability.

DA-5.1: Construct a sample space for an experiment and represent it as a list, chart, picture, or tree diagram.
DA-5.2: Use counting techniques to determine the number of possible outcomes of an event.
DA-5.3: Classify events as dependent or independent.
DA-5.4: Categorize two events as mutually exclusive or not mutually exclusive.
DA-5.5: Use the concept of complementary sets to compute probabilities.
DA-5.7: Carry out a procedure to compute simple probabilities and compound probabilities including conditional probabilities.
DA-5.9: Compare theoretical and experimental probabilities.

Textbook section	Standard	Vocabulary	Resources / examples
4.1 Sample spaces and probability 4.2 The Addition Rules of probability 4.3 The Multiplication Rules and Conditional probability 4.4 Counting rules 4.5 Probability and counting rules	DA-1.1 DA-1.3 DA-3.1 DA-4.10 DA-5.1 DA-5.2 DA-5.3 DA-5.4 DA-5.5 DA-5.7 DA-5.9	Classical probability Combination Complement of an event Compound event Conditional probability Dependent events Empirical probability Equally likely events Event Fundamental counting rule Independent events Law of large numbers Mutually exclusive events Outcome Permutation Probability Probability experiment Sample space Simple event	http://www.khanacademy.org/#browse This website contains links for probability and statistics. You will need to scroll through to find what you need. Favorite M&M Data Find Probability More Probability http://www.npr.org/templates/transcript/transcript.php?storyId=7320273 http://wiki.stat.ucla.edu/socr/index.php/SOCR_EduMaterials Example: Valerie runs a basket making store. Yesterday she counted 127 people who walked by her store, 58 of whom came into the store. Of the 58, only 25 bought something in the store.

<table>
<tr>
<td></td>
<td></td>
<td>Subjective probability
Tree diagram
Venn diagram</td>
<td>
A. Estimate the probability that a person who walks by the store will enter the store.
B. Estimate the probability that a person who walks into the store will buy something.
C. Estimate the probability that a person who walks by the store will come in and buy something.
D. Estimate the probability that a person who comes into the store will buy nothing.

Example: At Histirck Tool Shop, all 140 employees were asked about their political affiliation. The employees were grouped by type of work, as executives or production workers. The results are shown in the two way table below:
Political Affiliation
<table>
<tr><td>Type</td><td>D</td><td>R</td><td>I</td></tr>
<tr><td>E</td><td>5</td><td>34</td><td>9</td></tr>
<tr><td>W</td><td>63</td><td>21</td><td>8</td></tr>
<tr><td>Total</td><td>68</td><td>55</td><td>17</td></tr>
</table>
Let: E=Executive, PW=Production Worker, D=Democrat, R=Republican, I=Independent
A. Compute P(D) and P(E)
B. Compute P(D given E)
C. Are the events D and E independent?
D. Compute P(D and E)
E. Compute P(D or E)
Example: You toss a pair of dice.
A. Use the multiplication rule of counting to determine the number of possible pair of outcomes.
B. There are three even numbers on each die. How many outcomes are possible with even numbers appearing on each die? Create a tree
</td>
</tr>
</table>

			diagram to visually represent your solution. C. What is the probability that both dice will show an even number?

Concept: Discrete Probability Distributions (Chapter 5)
Timeline: 10 days

Standard:

Standard DA-1: The student will use the mathematical process of representation, connection, communication, reasoning and proof, and problem solving.

DA-1.5: Apply the principles of probability and statistics to solve problems in real world contexts.
DA-1.6: Communicate knowledge of data analysis and probability using mathematical terminology appropriately.

Standard DA-5: The student will demonstrate through the mathematical processes an understanding of the basic concepts of probability.

DA-5.6: Use the binomial probability distribution to solve problems
DA-5.8: Use a procedure to find the geometric probability in real world contexts
DA-5.10: Construct and compare theoretical and experimental probability distributions
DA-5.11: Use procedures to find the expected value of discrete random variables and construct meaning within contexts.
DA-5.12: Understand the law of large numbers

Textbook section	Standard	Vocabulary	Examples/resources
5.1 Probability Distributions 5.2 Mean, Variance, Standard Deviation, and Expectation 5.3 The Binomial Distribution 5.4 Other types of Distributions	DA-1.5 DA-1.6 DA-5.6 DA-5.8 DA-5.10 DA-5.11 DA-5.12	Binomial distribution Binomial experiment Discrete probability distribution Expected value Hypergeometric distribution Multinomial distribution Poisson distribution Random variable	http://www.computing.dcu.ie/~wuhai/chap05.pdf http://stattrek.com/Lesson1/Statistics-Intro.aspx?Tutorial=Stat (probability tutorial) Data Sets http://regentsprep.org/Regents/math/algtrig/ATS7/BPrac.htm Example: Which of the following are continuous variables and which are discrete?

			A. Speed of an airplane. B. Age of a college professor chosen at random C. Number of books in the college bookstore D. Weight of a football player chosen at random Example: Radcliff Heights University published a claim that 70% of all single men would welcome women taking the initiative in asking for a date. A random sample of 36 single men was asked if they would welcome a women asking for a date. Find the following probabilities: A. At least 18 of the men will say yes. B. Fewer than 3 of the men will say yes. C. None of the men will say yes. D. At least 5 of the men will say no. Examples: Rico is taking Calculus this semester on a pass/fail basis. The department teaching the course has a history of passing 75% of the students in each term. Let n= 1, 2, 3… represent the number of times a student takes Calculus until the first passing grade is received. (Assume the trials are independent) A. Write out a formula for the probability distribution of the random variable n. *(Part B through E you may use a calculator to solve the probabilities)* B. What is the probability that Rico passes on the first try? C. What is the probability that Rico first passes on the second try? (n=2) D. What is the probability that Rico needs three or more tries to pass Calculus? E. What is the expected number of attempts at Calculus Rico must make to have his (first) pass?

Concept: Normal Distribution (Chapter 6)
Timeline: 10 days

Standard:

Standard DA-1: The student will use the mathematical process of representation, connection, communication, reasoning and proof, and problem solving.

DA-1.2 Execute procedures to find measures of probability and statistics using tools such as hand held computing devices, spreadsheets, and statistical software
DA-1.5: Apply the principles of probability and statistics to solve problems in real world contexts.
DA-1.6: Communicate knowledge of data analysis and probability using mathematical terminology appropriately.

Standard DA-4: The student will demonstrate an understanding of basic statistical methods of analyzing data.

DA-4.7 Use procedures and/or technology to find measures of position (including median, quartiles, percentiles, standard scores) for given data.
DA-4.8 Classify a distribution as symmetric, positively skewed, or negatively skewed
DA-4.9 Explain the significance of the shape of the distribution
DA-4.10 Use knowledge of the Empirical Rule to solve problems involving data that is distributed normally

Textbook Sections	Standards	Vocabulary	Resources/ Examples
6.1 Normal Distributions 6.2 Applications of the Normal Distribution 6.3 The Central Limit Theorem 6.4 The Normal Approximation to the Binomial Distribution (optional)	DA-1.2 DA-1.5 DA-1.6 DA-4.7 DA-4.8 DA-4.9 DA-4.10	Central Limit Theorem Correction for continuity Negatively or left-skewed distribution Normal distribution Positively or right-skewed distribution Sampling distribution of sample means Sampling error Standard error of the mean Standard normal distribution Symmetric distribution z-score	Ketchup Control http://www.amstat.org/publications/jse/essd_activities.html Examples: A vending machine automatically pours coffee into cups. The amount of coffee dispensed into a cup is normally distributed with mean of 7.5 oz and standard deviation of 0.5 oz. A. Estimate the probability that the machine ill overflow an 8-oz cup. B. Estimate the probability that the machine will not overflow an 8-oz cup. C. The machine has just been loaded with 850 cups. How many of these do you expect will overflow when served?

			Examples: The National High School Physical Education Department offered an online Advanced First Aid course for credit during the fall semester. The scores on the comprehensive final exam were normally distributed and the z scores for some of the students are shown: Lee 1.10 Ron 1.70 Doug -2.00 Sally 0.00 Lucy -0.80 Yao 1.60 A. Which of these students scored above the mean? B. Which of these students scored on the mean? C. Which of these students scored below the mean? D. If the mean score was 150 with a standard deviation of 20, what was the final exam score for each student? The heights of 18 year old men are approximately normally distributed, with mean 68 inches and standard deviation 3 inches. a) What is the probability that an 18 year old man selected at random is between 67 and 69 inches tall? b) If a random sample of 9 18 year old men is selected, what is the probability that the mean height is between 67 and 69 inches?

Concept: Regression and Correlation (Chapter 10)
Timeline: 13 days

Standard:

Standard DA-1: The student will use the mathematical process of representation, connection, communication, reasoning and proof, and problem solving.

DA-1.4: Design and conduct a statistical research project, produce a report, and summarize the findings.
DA-1.7 Judge the reasonableness of solutions based on the source of the data, the design of the study, the way the data is displayed, and the way the data is analyzed
DA-1.8 Compare data sets using graphs and summary statistics

Standard DA-3: The student will demonstrate through the mathematical processes an understanding of the methodology for collecting, organizing, displaying, and interpreting data.

DA-3.5: Classify the shape of a scatter plot (including linear, quadratic, or exponential)
DA-3.6: Classify graphically and analytically the correlation between two variables as positive, negative, or no correlation
DA-3.7: Carry out a procedure to determine an equation for a trend line for a scatter plot exhibiting a linear pattern by using visual approximation
DA-3.8: Carry out a procedure to determine a line of best fir for a scatter plot exhibiting a linear pattern by using technology
DA-3.9: Explain the meaning of the correlation coefficient, r
DA-3.10: Use interpolation or extrapolation to predict values based on relationship between two variables.

Textbook section	standard	Vocabulary	Resources / Examples
10.1 Scatter plots and correlation 10.2 Regression 10.3 Coefficient of determination and standard error of the estimate (optional)	DA-1.4 DA-1.7 DA-1.8 DA-3.5 DA-3.6 DA-3.7 DA-3.8 DA-3.9 DA-3.10	Correlation Regression Simple relationship Independent variable Dependent variable Multiple relationship Positive relationship Negative relationship Scatter plot Correlation coefficient Population correlation coefficient Lurking variable Regression line Line of best fit Marginal change Extrapolation Influential points Interpolation	Step by Step Line of Best Fit SAT State Data Making Census Regression Project Ideas Correlation Project Idea Example: Let x be the magnitude of an earthquake (on Richter scale) and let y be the depth (in km) of the quake below the surface at the epicenter. x: 2.9 4.2 3.3 4.5 2.6 3.2 3.4 y: 5.0 8.9 9.9 6.7 4.4 3.9 5.5 A. Draw a scatter diagram for the given data. Discuss the visual shape of the plot and estimate an equation of the trend line. B. Draw a straight line that you think best fits the data. C. Discuss the correlation of the line of best fit. (be

			specific to direction and meaning) Examples: Find the least-squares regression line for the following data and utilize interpolation and extrapolation to solve the questions below. Let x= weight of a car (hundreds of pounds) Let y= miles per gallon (mpg) x: 27 44 32 47 23 40 34 52 y: 30 17 22 11 31 15 20 14 A. Draw a scatter diagram for the following data. B. Find the equation of the least-squares regression line. C. Graph the LSRL on the scatter plot. D. Suppose that a car weighs 38 (hundred pounds) what does the least-squares regression line forecast for y= mpg? E. Suppose that a car weighs 54 (hundred pounds) what does the least-squares regression line forecast for y= mpg? F. Is it safe to use extrapolation within the study of statistics? Find the correlation coefficient and coefficient of determination values and summarize in writing their importance in context of this problem.

Teacher Note: This College Prep- Data Analysis and Probability consensus map is based on a 90 min block schedule for 90 days. The suggested timeline will take up 80 days, leaving room for individual pacing and review.

Precalculus CP (Carter, Cuevas, Glencoe Publishing)

Unit 1, Chapter 1: Functions from a Calculus Perspective
Timeline: 12 days

2007 Standards

Standard PC-1: The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation.

PC-1.5 Demonstrate an understanding of algebraic and trigonometric relationships by using a variety of representations (including verbal, graphic, numerical, and symbolic).

Standard PC-2: The student will demonstrate through the mathematical processes an understanding of the characteristics and behaviors of functions and the effect of operations on functions.

PC-2.1 Carry out a procedure to graph parent functions (including $y = x^n$, $y = \log_a x$, $y = \ln x$, $y = \frac{1}{x}$, $y = e^x$, $y = a^x$, $y = \sin x$, $y = \cos x$, $y = \tan x$, $y = \csc x$, $y = \sec x$, and $y = \cot x$).

PC-2.2 Carry out a procedure to graph transformations (including $-f(x)$, $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, $f(-x)$, $f(b \cdot x)$, $|f(x)|$, and $f(|x|)$) of parent functions and combinations of transformations.

PC-2.3 Analyze a graph to describe the transformation (including $-f(x)$, $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, $f(-x)$, $f(b \cdot x)$, $|f(x)|$, and $f(|x|)$) of parent functions.

PC-2.5 Analyze graphs, tables, and equations to determine the domain and range of parent functions or transformations of parent functions (including $y = x^n$, $y = \log_a x$, $y = \ln x$, $y = \frac{1}{x}$, $y = e^x$, $y = a^x$, $y = \sin x$, $y = \cos x$, $y = \tan x$, $y = \csc x$, $y = \sec x$, and $y = \cot x$).

PC-2.6 Analyze a function or the symmetry of its graph to determine whether the function is even, odd, or neither.

PC-2.7 Recognize and use connections among significant points of a function (including roots, maximum points, and minimum points), the graph of a function, and the algebraic representation of a function.

PC-2.8 Carry out a procedure to determine whether the inverse of a function exists.

PC-2.9 Carry out a procedure to write a rule for the inverse of a function, if it exists.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
1.1 Functions	PC-1.5	Set-Builder Notation Interval Notation Relation Function Function Notation Domain	Example: Which of the following pairs of equations are equivalent? Explain. $x^2 = 16$ and $x = 4$ $x = \sqrt{25}$ and $x = 5$ $(x-1)^2 = (x-1)(x-2)$ and $x - 2 = x - 1$

		Range Independent Variable Dependent Variable Implied Domain Piecewise-Defined Function Relevant Domain Difference Quotient (#63-74,p.11)	
1.2 Analyzing Graphs of Functions and Relations	PC-2.6	Vertical Line Test Zeros/Roots/x-intercepts Line Symmetry Point Symmetry Odd Function Even Function	Example: Use a graphing utility to conjecture whether the function is even odd or neither. Verify your conjecture algebraically. $f(x) = x^2 - 6$ Example: An open box with a square base is required to have a volume of 10 cubic feet. The amount of B of material used to make such a box as a function of the length x of a side of the square base is: $B(x) = x^2 + \frac{40}{x}$. Graph B(x) and determine where B is the smallest.
1.4 Extrema and Average Rates of Change	PC-2.7	Increasing Decreasing Constant Maximum Minimum Extrema Average Rate of Change Secant Line	Model With Math Example: #33, p. 41
1.5 Parent Functions and Transformations	PC-2.1 PC-2.5	Constant Function Identity Function Linear Function Squaring (Quadratic) Function Cubic Function Square Root Function Reciprocal Function Step Function Piecewise Function Absolute Value Function Greatest Integer	Example: For the following function: $f(x) = \begin{cases} -2x+1 & \text{if } -1 \le x < 1 \\ 2 & \text{if } x = 1 \\ x^2 & \text{if } x > 1 \end{cases}$ a. Determine the range and domain of f(x). b. Find f(0), f(1), f(2) c. Sketch a graph of f(x) http://education.ti.com (Keyword Search: How Americans Got So Jittery)

		Function Vertical/Horizontal Shifts Reflections Rigid Transformations Non-Rigid Transformations Vertical/Horizontal Stretch Vertical/Horizontal Shrink	
1.6 Function Operations and Compositions of Functions	PC-2.2 PC-2.3	Composition	Example: Graph the following original parent function and then verbally and or in written format, discuss the transformations that will occur. $f(x) = x^2$ a. $f(x) = -x^2 + 2$ b. $f(x) = (x-2)^2$ c. $f(x) = 2x^2$ d. $f(x) = -\lvert x^2 \rvert$
1.7 Inverse Relations and Functions	PC-2.8 PC-2.9	Inverse Relation Inverse Function One-to-One Function Horizontal Line Test	Example: Given the following function, find its inverse (if it exists) and state the range and domain of the inverse function. (if it exists) $f(x) = \sqrt{x-4}$

Unit 2, Chapter 2: Power, Polynomial, and Rational Functions
Timeline: 12 days

2007 Standards

Standard PC-1: The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation.

PC-1.3 Apply algebraic methods to solve problems in real-world contexts.

Standard PC-2: The student will demonstrate through the mathematical processes an understanding of the characteristics and behaviors of functions and the effect of operations on functions.

PC-2.1 Carry out a procedure to graph parent functions (including $y = x^n$, $y = \log_a x$, $y = \ln x$, $y = \frac{1}{x}$, $y = e^x$, $y = a^x$, $y = \sin x$, $y = \cos x$, $y = \tan x$, $y = \csc x$, $y = \sec x$, and $y = \cot x$).

PC-2.4 Carry out procedures to algebraically solve equations involving parent functions or transformations of parent functions (including $y = x^n$, $y = \log_a x$, $y = \ln x$, $y = \frac{1}{x}$, $y = e^x$, $y = a^x$, $y = \sin x$, $y = \cos x$, $y = \tan x$, $y = \csc x$, $y = \sec x$, and $y = \cot x$).

Standard PC-3: The student will demonstrate through the mathematical processes an understanding of the behaviors of polynomial and rational functions.

PC-3.1 Carry out a procedure to graph quadratic and higher-order polynomial functions by analyzing intercepts and end behavior.
PC-3.2 Apply the rational root theorem to determine a set of possible rational roots of a polynomial equation.
PC-3.3 Carry out a procedure to calculate the zeros of polynomial functions when given a set of possible zeros.
PC-3.4 Carry out procedures to determine characteristics of rational functions (including domain, range, intercepts, asymptotes, and discontinuities).
PC-3.6 Carry out a procedure to solve polynomial equations algebraically.
PC-3.7 Carry out a procedure to solve polynomial equations graphically.
PC-3.8 Carry out a procedure to solve rational equations algebraically.
PC-3.9 Carry out a procedure to solve rational equations graphically.
PC-3.10 Carry out a procedure to solve polynomial inequalities algebraically.
PC-3.11 Carry out a procedure to solve polynomial inequalities graphically.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
2.1 Power and Radical Functions	PC-2.1 PC-3.1	Power Function Monomial Function Radical Function Axis of Symmetry Standard Form of a Quadratic Vertex	Example: Graph the function f(x) by hand and determine whether its graph opens up or down and find its vertex, axis of symmetry, y-intercept, and x-intercepts, if any. $f(x) = -4x^2 - 5x + 2$ Also determine what happens to the function output values as the x values approach negative and positive infinity.
2.2 Polynomial Functions	PC-3.1	Polynomial Function Leading Coefficient Leading-Term Test Turning Point Quadratic Form Repeated Zero Multiplicity Intermediate Value Theorem Continuous Function	Example: Sketch the graphs of the following functions and determine the range and domain of the graphs. a. $f(x) = x^5 - 4$ b. $f(x) = \frac{x^4}{2}$ c. $f(x) = (x-2)^2$ d. $f(x) = x^2 - 2$ e. $f(x) = x^3 + 1$
2.3 The Remainder and Factor Theorems	PC-1.3 PC-3.5	Division Algorithm Long Division Synthetic Division Synthetic Substitution Depressed Polynomial Remainder Theorem Factor Theorem	In text Example, #52, p. 116
2.4 Zeros of Polynomial Functions	PC-3.2 PC-3.3 PC-3.6 PC-3.7 PC-2.4	Fundamental Theorem of Algebra Rational Zero Theorem Linear Factorization Theorem Complex Conjugates Prime (Irreducible over the Reals) Upper/Lower Bounds Descartes' Rule of Signs	Example: Given the function $f(x) = 2x^3 + 11x^2 - 7x - 6$ and the possible zeros of $\pm 1, 2, 3, 6, \frac{1}{2}, \frac{3}{2}$ Find the actual zeros of the function. Example: Solve for following polynomial equation algebraically. $6x^4 + 24x^3 = 0$ Verify your solution using your graphing utility.

			Example: Find the real zeros of the following polynomial function. $f(x) = x^5 - x^4 - 4x^3 + 8x^2 - 32x + 48$ http://education.ti.com (Keyword Search: Investigation of End Behavior)
2.5 Rational Functions	PC-3.4 PC-3.8 PC-3.9	Rational Function Asymptote Vertical Asymptote Horizontal Asymptote Oblique Asymptote Holes (Point Discontinuity)	Example: Find the given functions vertical, horizontal or oblique asymptotes and then be sure to discuss the functions range, domain, intercepts. Sketch a graph of the function. $R(x) = \frac{1}{x^2 + 4x + 4}$ In text, pp.188 – 189: Examples 8 and 9 Example: Find the real zeros, the vertical asymptotes, and the end behavior model for $f(x) = \frac{30}{x} + \frac{90}{x + 20}$
2.6 Nonlinear Inequalities	PC-3.10 PC-3.11	Polynomial Inequality Sign Chart Key Intervals Rational inequality	Example: Solve each of the following inequalities algebraically. a. $x + \frac{12}{x} < 7$ b. $x^3 - 2x^2 - 3x > 0$

Unit 3, Chapter 3: Exponential and Logarithmic Functions
Timeline: 12 days

2007 Standards

Standard PC-1: The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation.

PC-1.4 Judge the reasonableness of mathematical solutions.

PC-1.6 Understand how algebraic and trigonometric relationships can be represented in concrete models, pictorial models, and diagrams.

Standard PC-2: The student will demonstrate through the mathematical processes an understanding of the characteristics and behaviors of functions and the effect of operations on functions.

PC-2.4 Carry out procedures to algebraically solve equations involving parent functions or transformations of parent functions (including $y = x^n$, $y = \log_a x$, $y = \ln x$, $y = \frac{1}{x}$, $y = e^x$, $y = a^x$, $y = \sin x$, $y = \cos x$, $y = \tan x$, $y = \csc x$, $y = \sec x$, and $y = \cot x$).

Standard PC-4: The student will demonstrate through the mathematical processes an understanding of the behaviors of exponential and logarithmic functions.

PC-4.1 Carry out a procedure to graph exponential functions by analyzing intercepts and end behavior.

PC-4.2 Carry out a procedure to graph logarithmic functions by analyzing intercepts and end behavior.

PC-4.3 Carry out procedures to determine characteristics of exponential functions (including domain, range, intercepts, and asymptotes).

PC-4.4 Carry out procedures to determine characteristics of logarithmic functions (including domain, range, intercepts, and asymptotes).

PC-4.5 Apply the laws of exponents to solve problems involving rational exponents.

PC-4.6 Analyze given information to write an exponential function that models a given problem situation.

PC-4.7 Apply the laws of logarithms to solve problems.

PC-4.8 Carry out a procedure to solve exponential equations algebraically.

PC-4.9 Carry out a procedure to solve exponential equations graphically.

PC-4.10 Carry out a procedure to solve logarithmic equations algebraically.

PC-4.11 Carry out a procedure to solve logarithmic equations graphically.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
3.1 Exponential Functions	PC-4.1 PC-4.3 PC-4.6 PC-2.4	Algebraic Function Transcendental Function Exponential Function Natural Base Common Base Compound Interest Continuous Compounding Radioactive Decay Exponential Growth Model Exponential Decay Model	Example: Solve the following equations: a. $e^{-x^2} = (e^x)^2 \bullet \frac{1}{e^3}$ b. $8^{x^2-2x} = \frac{1}{2}$ c. If $4^x = 7$ then what does 4^{-2x} equal? Example: A model for the number of people N in a high school community who have heard a certain rumor is: $N = P(1-e^{-0.15d})$ where P is the total population of the community and d is the number of days that have elapsed since the rumor began. In a community of 1500 students, how many students will have heard the rumor after 4 days? Example: You invest $2000 for 10 years with no withdrawals. Find the value of your investment given a. 5 % compounded monthly? b. 6 % compounded continuously? Use formula: a. $P = A(1+\frac{r}{n})^{nt}$ b. $P = Ae^{rt}$

			Example: How long will it take for an investment to double in value if it earns 5% compounded continuously? Use formula: $P = Ae^{rt}$
3.2 Logarithmic Functions	PC-4.2 PC-4.4 PC-2.4	Logarithmic Function Common Logarithmic Function Natural Logarithmic Function	Example: Solve each of the equations for the x variable. a. $\log_4 64 = x$ b. $\ln e^x = 5$ c. $\log_6 36 = 5x + 3$ d. $\log_x (\frac{1}{8})=3$ Example: Determine range and domain and also state the equation of the vertical asymptote of each function below: a. $\ln(4 - x) = h(x)$ b. $3 + \log(4 - x) = f(x)$ c. $2 - \ln x = g(x)$ Example: Solve for the following equation using the laws of exponents. $e^{\frac{1}{x}} = 4$ Example: Solve $\log_2 x = \frac{3}{2}$ algebraically and graphically. Example: a. Simplify $16^{\frac{1}{4}}$, $16^{-\frac{1}{4}}$, $8^{\frac{2}{3}}$, $8^{-\frac{2}{3}}$.

			b. Solve: $9^{x+1} = \sqrt{27}$ c. A house bought five years ago for \$100,000 was just sold for \$135,000. To the nearest tenth of a percent, what was the annual growth rate?
3.3 Properties of Logarithms	PC-4.7	Product Property Quotient Property Power Property Change-of-Base Formula	Example: Express as a single logarithm $21\log_3 \sqrt[3]{x} + \log_3 \left(9x^2\right) - \log_3 9$ Example: Use the change-of-base theorem to evaluate $\log_3 12$ to the nearest hundredth.
3.4 Exponential and Logarithmic Equations	PC-1.4 PC-2.4 PC-4.5 PC-4.8 PC-4.9 PC-4.10 PC-4.11 PC-2.4	One-to-One Property Extraneous Solutions	Example: Solve each equation. a. $\log_4(x+2) = \log_4 8$ b. $\ln x + \ln(x+2) = 4$ c. $2^x = 10$ d. $e^{x+3} = \pi$

Unit 4, Chapter 4: Trigonometric Functions
Timeline: 16 days

2007 Standards

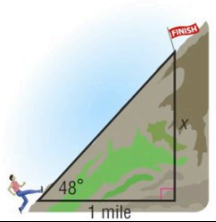
Standard PC-1: The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation.

PC-1.2 Connect algebra and trigonometry with other branches of mathematics.
PC-1.6 Understand how algebraic and trigonometric relationships can be represented in concrete models, pictorial models, and diagrams.

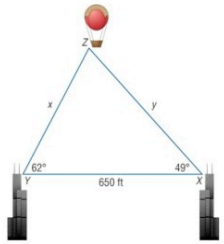
Standard PC-5: The student will demonstrate through the mathematical processes an understanding of the behaviors of trigonometric functions.

PC-5.1 Understand how angles are measured in either degrees or radians.
PC-5.2 Carry out a procedure to convert between degree and radian measures.
PC-5.4 Carry out a procedure to graph trigonometric functions by analyzing intercepts, periodic behavior, and graphs of reciprocal functions.
PC-5.5 Carry out procedures to determine the characteristics of trigonometric functions (including domain, range, intercepts, and asymptotes).
PC-5.6 Apply a procedure to evaluate trigonometric expressions.
PC-5.7 Analyze given information to write a trigonometric function that models a given problem situation involving periodic phenomena.
PC-5.8 Analyze given information to write a trigonometric equation that models a given problem situation involving right triangles.
PC-5.9 Carry out a procedure to calculate the area of a triangle when given the lengths of two sides and the measure of the included angle.
PC-5.12 Apply the laws of sines and cosines to solve problems.
PC-5.13 Apply a procedure to graph the inverse functions of sine, cosine, and tangent.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
4.1 Right Triangle Trigonometry	PC-5.6 PC-5.8	Trigonometric Functions Reciprocal Functions Hypotenuse Opposite Side Adjacent Side Inverse Trigonometric Function Angle of Elevation Angle of Depression	Stress evaluation of trigonometric functions

			Real-World EXAMPLE 4 Find a Missing Side Length **SPORTS** A competitor in a hiking competition must climb up the inclined course as shown to reach the finish line. Determine the distance in feet that the competitor must hike to reach the finish line. (Hint: 1 mile = 5280 feet.) 
4.2 Degrees and Radians	PC-5.1 PC-5.2	Initial Side Terminal Side Vertex Standard Position Positive/Negative Angles Coterminal Measure of an Angle Central Angle Radian Acute Obtuse Complementary Supplementary Degree Linear Speed Angular Speed Arc Length of a Sector Area of a Sector	Which of the pairs represent coterminal angles? a. $\frac{\pi}{2}, -\frac{3\pi}{2}$ b. $45°, -315°$ c. $100°, -100°$ d. $\frac{2\pi}{5}, -\frac{8\pi}{5}$ Example: Convert each angle in radians to degrees. a. $\frac{5\pi}{6}$ b. $\frac{\pi}{2}$ c. $\frac{-3\pi}{4}$ Example: Find the exact value of the following trigonometric expressions:

			a. $\tan(4\pi)$ b. $\csc\frac{11\pi}{2}$ c. $\sec 8\pi$
4.3 Trigonometric Functions on the Unit Circle **4.4 Graphing Sine and Cosine Functions** **4.5 Graphing Other Trigonometric Functions**	PC-5.4 PC-5.5 PC-5.6 PC-5.7 PC-5.8 PC-1.2 PC-1.6	Quadrantal Angle Unit Circle Circular Function Periodic Function Period of a Function Reference Angle Key Points Amplitude Frequency Phase Shift Vertical Shift Midline Damped Trigonometric Function Damping Factor Damped Oscillation Damped Wave Simple Harmonic Motion Damped Harmonic Motion	Example: Use the fact that the trigonometric functions are periodic to find the exact value of each of the four remaining trigonometric functions (non-calculator). a. $\sin\theta = \frac{-3}{5}$ and $\cos\theta = \frac{4}{5}$ b. $\sin\theta = \frac{\sqrt{3}}{2}$ and $\cos\theta = \frac{1}{2}$ Example: Determine the amplitude and period of each function. Discuss the range, domain, intercepts of each function and graph the function. a. $f(x) = -4\cos(2x)$ b. $g(x) = \frac{4}{3}\sin(\pi x - \frac{\pi}{2}) + 1$ c. $h(x) = 2\cos(4x + 3\pi) - 1$ Example: According to the Old Farmer's Almanac, the number of hours of sunlight in Boston on the summer solstice is 15.283and the number of hours of sunlight on the winter solstice is 9.067. a. Find a sinusoidal function of the form $y = A\sin(\omega x - \phi) + B$ that fits the data. b. Use the function found in part(a) to predict the number of hours of sunlight on April 1, the 91st day of the year. c. Draw a graph of the function found in part (a) d. Look up the number of hours of sunlight for April 1 in the Old Farmer's Almanac and compare the actual hours of daylight to the results found in part a.

4.6 Inverse Trigonometric Functions	PC-5.13	Inverse Trig Functions Arcsine (Inverse Sine) Arccosine (Inverse Cosine) Arctangent (Inverse Tangent)	Example: Sketch the graph of the following inverse functions, state the domain and range of each. a. $f(x) = \sin^{-1} x$ b. $g(x) = \tan^{-1} x$ c. $h(x) = \cos^{-1} x$
4.7 The Law of Sines and the Law of Cosines	PC-5.9 PC-5.12	Oblique Triangles Law of Sines AAS, ASA SSA (Ambiguous Case) Law of Cosines SAS, SSS Area Formulas Heron's Formula	**Real-World EXAMPLE 2** Apply the Law of Sines (ASA) **BALLOONING The angle of elevation from the top of a building to a hot air balloon is 62º. The angle of elevation to the hot air balloon from the top of a second building that is 650 feet due east is 49º. Find the distance from the hot air balloon to each building.** Draw a figure showing the situation.  Example: Find the area of the triangles given the following information: a. $a = 3, b = 4, \angle C = 40^o$ b. $a = 2, b = 2, c = 2$ c. b=4,c=1, $\angle$A=120º $d.\ a = 2, b = 3, c = 4$ Use $A = \frac{1}{2}(side_1)(side_2)(\sin\ included\ \angle)$ in problems a and c. For problem b, use the Area of Equilateral Triangle Formula $A = \frac{s^2\sqrt{3}}{4}$. Then use the Law of Cosines to find an included angle and then use

			$A = \frac{1}{2}(side_1)(side_2)(\sin\ included\ \angle)$. For problem d, use Heron's Formula $A = \sqrt{s(s-a)(s-b)(s-c)}$ where $s = \frac{a+b+c}{2}$. Then use the Law of Cosines to find an included angle and then use $A = \frac{1}{2}(side_1)(side_2)(\sin\ included\ \angle)$. Show that both formulas yield the same area.

Unit 5, Chapter 5: Trigonometric Identities and Equations
Timeline: 10 days

2007 Standards

Standard PC-1: The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation.

Standard PC-2: The student will demonstrate through the mathematical processes an understanding of the characteristics and behaviors of functions and the effect of operations on functions.

PC-2.4 Carry out procedures to algebraically solve equations involving parent functions or transformations of parent functions (including $y = x^n$, $y = \log_a x$, $y = \ln x$, $y = \frac{1}{x}$, $y = e^x$, $y = a^x$, $y = \sin x$, $y = \cos x$, $y = \tan x$, $y = \csc x$, $y = \sec x$, and $y = \cot x$).

Standard PC-5: The student will demonstrate through the mathematical processes an understanding of the behaviors of trigonometric functions.

PC-5.10 Carry out a procedure to solve trigonometric equations algebraically.

PC-5.11 Carry out a procedure to solve trigonometric equations graphically.

PC-5.14 Apply trigonometric relationships (including reciprocal identities; Pythagorean identities; even and odd identities; addition and subtraction formulas of sine, cosine, and tangent; and double angle formulas) to verify other trigonometric identities.

PC-5.15 Carry out a procedure to compute the slope of a line when given the angle of inclination of the line.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
5.1 Trigonometric Identities **5.2 Verifying Trigonometric Identities**	PC-5.14	Equation vs. Identity Reciprocal Identities Quotient Identities Pythagorean Identities Even/Odd Identities Cofunction Identities	Example: Use algebraic techniques to prove each identity. a. $\sec\theta \bullet \sin\theta = \tan\theta$ b. $(\csc\theta + \cot\theta)(\csc\theta - \cot\theta) = 1$ c. $\frac{\cos^2\theta - \sin^2\theta}{1 - \tan^2\theta} = \cos^2\theta$

			Example: Use properties of trigonometric function to find the exact value of each expression. (non-calculator) a. $\sin^2 40^o + \cos^2 40^o$ b. $\tan 40^o - \dfrac{\sin 40^o}{\cos 40^o}$ c. $\cos 400^o \bullet \sec 40^o$
5.3 Solving Trigonometric Equations	PC-5.10 PC-5.11 PC-5.14 PC-2.4		Example: Solve each equation on the interval $0 \le \theta < 2\pi$ algebraically. Justify your answers graphically. a. $4\cos^2 \theta = 1$ b. $\tan \theta + 1 = 0$ c. $5\csc \theta - 3 = 2$ d. $1 - \cos \theta = \dfrac{1}{2}$ Example: Use a graphing utility to solve each equation on the interval $0 \le \theta < 2\pi$. Round answers to two decimal places. a. $\sin \theta = 0.4$ b. $\tan \theta = 5$ c. $\csc \theta = -3$
5.4 Sum and Difference Identities **5.5 Multiple-Angle and Product-To-Sum Identities**	PC-5.14 PC-5.15	Double-Angle Formulas Half-Angle Formulas	Condense and simplify. a. $\sin 20^o \cos 10^o + \cos 20^o \sin 10^o$ b. $\cos \dfrac{5\pi}{12} \cos \dfrac{7\pi}{12} - \sin \dfrac{5\pi}{12} \sin \dfrac{7\pi}{12}$

			Note: Be sure to address problem 56 on p. 342 as this exercise addresses indicator PC-5.15 (computing the slope of a line given the angle of inclination).

Unit 6, Chapter 7: Conic Sections and Parametric Equations
Sec. 9.1: Polar Coordinates
Timeline: 10 days

2007 Standards

Standard PC-1: The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation.

Standard PC-5: The student will demonstrate through the mathematical processes an understanding of the behaviors of trigonometric functions.

PC-5.3 Carry out a procedure to plot points in the polar coordinate system.

Standard PC-6: The student will demonstrate through the mathematical processes an understanding of the behavior of conic sections both geometrically and algebraically.

PC-6.1 Carry out a procedure to graph the circle whose equation is the form $(x-h)^2+(y-k)^2=r^2$.

PC-6.2 Analyze given information about the center and the radius or the center and the diameter to write an equation of a circle.

PC-6.3 Apply a procedure to calculate the coordinates of points where a line intersects a circle.

PC-6.4 Carry out a procedure to graph the ellipse whose equation is the form $\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$.

PC-6.5 Carry out a procedure to graph the hyperbola whose equation is the form $\frac{(x-h)^2}{a^2}-\frac{(y-k)^2}{b^2}=1$.

PC-6.6 Carry out a procedure to graph the parabola whose equation is the form $y-k=a(x-h)^2$.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
7.1 Parabolas	PC-6.6	Conic section Degenerate Conic Locus Parabola Focus Directrix Axis of Symmetry Vertex Latus Rectum Standard Form of a Parabola	Example: Find the vertex and two other points of interest for each parabola. Graph (non-calculator). Verify by using a graphing utility. a. $y^2 = 8x$ b. $y^2 - 2y = 8x - 1$ c. $x^2 + 6x - 4y + 1 = 0$
7.2 Ellipses and Circles	PC-6.1 PC-6.2 PC-6.4 PC-6.3	Ellipse Foci Major Axis Center Minor Axis Vertices Eccentricity Standard Form of a Circle Radius Center	Example: Draw a graph of the following circle. $(x-3)^2 + (y+4)^2 = 25$ Example: Given a radius = 6 and a center located at the point (4,-3) write the standard form of the equation of the circle. Example: Write the following equation in the standard form of a circle and then graph: $x^2 + y^2 + 2x - 4y - 4 = 0$ Example: Find an equation for the ellipse with a center at $(2,-3)$, one focus at $(3,-3)$ and one vertex at $(5,-3)$, then graph the ellipse. Example: Graph the following ellipse (non-calculator). $\frac{(x-2)^2}{9} + \frac{(y+3)^2}{4} = 1$ Be sure to address problems 55-58 on p. 440. These address indicator 6-3 (points where a line intersects a circle).
7.3 Hyperbolas	PC-6.5	Hyperbola Transverse Axis	Example:

		Conjugate Axis Standard Form of a Hyperbola	Graph the following hyperbola (non-calculator). $\frac{(y+3)^2}{4}-\frac{(x-2)^2}{9}=1$ Write the equation of the asymptotes in point-slope form. Example: Find and state the center, transverse axis, vertices and asymptotes for the following hyperbola. Graph the given hyperbola. $x^2-y^2-2x-2y-1=0$
9.1 Polar Coordinates	PC-5.3	Polar Coordinate System Pole Polar Axis Polar Coordinates Polar Equation Polar Graph	Example: Plot the points $(3,\pi),\left(-2,\frac{\pi}{4}\right),\left(1.5,\frac{-\pi}{2}\right),\left(-\sqrt{3},-\frac{2\pi}{3}\right)$ http://education.ti.com (Keyword Search: Transitions) Polar Graphing- Slider

- **If time allows, provide an introduction to calculus using the following textbook material.**
  - **Section 1.3 (Continuity, End Behavior, and Limits)**
  - **Section 12.1 (Estimating Limits Graphically)**
  - **Section 12.2 (Evaluating Limits Algebraically)**
  - **Section 12.3 (Tangent Lines and Velocity)**

Notes on pacing
*Unit 1: 12 days, Unit 2: 12 days, Unit 3: 12 days, Unit 4: 16 days, Unit 5: 10days, Unit 6: 10 days *Total: 72 days of instruction. *With 1 day of review and 1 test per unit, this accounts for 84 days, leaving time for exam review, pacing adjustments to clarify misconceptions, or the inclusion of the introduction to calculus topics from above.

Precalculus with Limits: A Graphing Approach (Ron Larson)

Chapter 1: Functions and Their Graphs
Timeline: 9 days

2007 Standards

Standard PC-1: The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation.

PC-1.5 Demonstrate an understanding of algebraic and trigonometric relationships by using a variety of representations (including verbal, graphic, numerical, and symbolic).

Standard PC-2: The student will demonstrate through the mathematical processes an understanding of the characteristics and behaviors of functions and the effect of operations on functions.

PC-2.1 Carry out a procedure to graph parent functions (including $y = x^n$, $y = \log_a x$, $y = \ln x$, $y = \frac{1}{x}$, $y = e^x$, $y = a^x$, $y = \sin x$, $y = \cos x$, $y = \tan x$, $y = \csc x$, $y = \sec x$, and $y = \cot x$).

PC-2.2 Carry out a procedure to graph transformations (including $-f(x)$, $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, $f(-x)$, $f(b \cdot x)$, $|f(x)|$, and $f(|x|)$) of parent functions and combinations of transformations.

PC-2.3 Analyze a graph to describe the transformation (including $-f(x)$, $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, $f(-x)$, $f(b \cdot x)$, $|f(x)|$, and $f(|x|)$) of parent functions.

PC-2.5 Analyze graphs, tables, and equations to determine the domain and range of parent functions or transformations of parent functions (including $y = x^n$, $y = \log_a x$, $y = \ln x$, $y = \frac{1}{x}$, $y = e^x$, $y = a^x$, $y = \sin x$, $y = \cos x$, $y = \tan x$, $y = \csc x$, $y = \sec x$, and $y = \cot x$).

PC-2.6 Analyze a function or the symmetry of its graph to determine whether the function is even, odd, or neither.

PC-2.7 Recognize and use connections among significant points of a function (including roots, maximum points, and minimum points), the graph of a function, and the algebraic representation of a function.

PC-2.8 Carry out a procedure to determine whether the inverse of a function exists.

PC-2.9 Carry out a procedure to write a rule for the inverse of a function, if it exists.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
1.2 Functions	PC-1.5	Relation Function Domain Range Independent Variable	In text, p. 26: #74

		Dependent Variable Difference Quotient Square Root Function Piecewise Function	Example: Which of the following pairs of equations are equivalent? Explain. $x^2 = 16$ and $x = 4$ $x = \sqrt{25}$ and $x = 5$ $(x-1)^2 = (x-1)(x-2)$ and $x - 2 = x - 1$ http://education.ti.com (Keyword Search: How Americans Got So Jittery)
1.3 Graphs of Functions	PC-2.6 PC-2.7	Vertical Line Test Zeros of a Function Odd Function Even Function Increasing on an Interval Decreasing on an Interval Constant on an Interval Relative Minimum Relative Maximum Average Rate of Change Average Speed Secant Line	In text, p. 39: #92 Example: Use a graphing utility to conjecture whether the function is even odd or neither. Verify your conjecture algebraically. $f(x) = x^2 - 6$ Example: An open box with a square base is required to have a volume of 10 cubic feet. The amount of B of material used to make such a box as a function of the length x of a side of the square base is: $B(x) = x^2 + \frac{40}{x}$. Graph B(x) and determine where B is the smallest.
1.4 Shifting, Reflecting and Stretching Graphs	PC-2.1 PC-2.5 PC-2.2 PC-2.3	Constant Function Identity Function Linear Function Squaring (Quadratic) Function Cubic Function Reciprocal Function Step Function Vertical/Horizontal Shifts Reflections Rigid Transformations Non-Rigid Transformations Vertical/Horizontal Stretch Vertical/Horizontal	In text, p.49: #66 http://education.ti.com/downloads/guidebooks/apps/83transformation_graphing/transgraph-eng.pdf Example: For the following function: $f(x) = \begin{cases} -2x+1 & \text{if } -1 \le x < 1 \\ 2 & \text{if } x = 1 \\ x^2 & \text{if } x > 1 \end{cases}$ a. Determine the range and domain of f(x). b. Find f(0), f(1), f(2) c. Sketch a graph of f(x)

		Shrink	Example: Graph the following original parent function and then verbally and or in written format, discuss the transformations that will occur. $f(x) = x^2$ a. $f(x) = -x^2 + 2$ b. $f(x) = (x-2)^2$ c. $f(x) = 2x^2$ d. $f(x) = -\lvert x^2 \rvert$
1.5 Combination of Functions Honors Only	PC-1.5	Sum Difference Product Quotient Composition	In text, p. 59: #88, 98
1.6 Inverse Functions	PC-2.8 PC-2.9	One-to-One Function Horizontal Line Test	In text, p. 70: #118 Example: Given the following function, find its inverse (if it exists) and state the range and domain of the inverse function. (if it exists) $f(x) = \sqrt{x-4}$

Chapter 2: Polynomial and Rational Functions
Timeline: 9 days

2007 Standards

Standard PC-1: The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation.

Standard PC-3: The student will demonstrate through the mathematical processes an understanding of the behaviors of polynomial and rational functions.

PC-3.1 Carry out a procedure to graph quadratic and higher-order polynomial functions by analyzing intercepts and end behavior.
PC-3.2 Apply the rational root theorem to determine a set of possible rational roots of a polynomial equation.
PC-3.3 Carry out a procedure to calculate the zeros of polynomial functions when given a set of possible zeros.
PC-3.4 Carry out procedures to determine characteristics of rational functions (including domain, range, intercepts, asymptotes, and discontinuities).
PC-3.6 Carry out a procedure to solve polynomial equations algebraically.
PC-3.7 Carry out a procedure to solve polynomial equations graphically.
PC-3.8 Carry out a procedure to solve rational equations algebraically.
PC-3.9 Carry out a procedure to solve rational equations graphically.
PC-3.10 Carry out a procedure to solve polynomial inequalities algebraically.
PC-3.11 Carry out a procedure to solve polynomial inequalities graphically.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
2.1 Quadratic Functions	PC-3.1	Polynomial Functions Axis of Symmetry Standard Form of a Quadratic Vertex	In text, p.98: #65 Example: Graph the function f(x) by hand and determine whether its graph opens up or down and find its vertex, axis of symmetry, y-intercept, and x-intercepts, if any. $f(x) = -4x^2 - 5x + 2$ Also determine what happens to the function output values as the x values approach negative and positive infinity.
2.2 Polynomial Functions of a Higher Degree	PC-3.1	Power Functions Leading Coefficient Test Multiplicity Intermediate Value Theorem Continuous Function	In text, p.111: #112 Example: Sketch the graphs of the following functions and determine the range and domain of the graphs. a. $f(x) = x^5 - 4$ b. $f(x) = \frac{x^4}{2}$ c. $f(x) = (x-2)^2$ d. $f(x) = x^2 - 2$ e. $f(x) = x^3 + 1$
2.3 Real Zeros of Polynomial Functions	PC-3.2 PC-3.3 PC-3.6 PC-3.7	Division Algorithm Long Division Synthetic Division Remainder Theorem Factor Theorem Rational Zero Test Prime (Irreducible over the Reals) Upper/Lower Bounds Descartes' Rule of Signs	In text, p. 127: #104 Example: Given the function $f(x) = 2x^3 + 11x^2 - 7x - 6$ and the possible zeros of $\pm 1, 2, 3, 6, \frac{1}{2}, \frac{3}{2}$ Find the actual zeros of the function. Example: Solve for following polynomial equation algebraically. $6x^4 + 24x^3 = 0$ Verify your solution using your graphing utility. $6x^4 + 24x^3 = 0$ Verify your solution using your graphing utility.

			Example: Find the real zeros of the following polynomial function. $f(x) = x^5 - x^4 - 4x^3 + 8x^2 - 32x + 48$
2.6 Rational Functions and Asymptotes	PC-3.4	Vertical Asymptotes Horizontal Asymptotes	In text, p. 148: #45 Example: Find the given functions vertical, horizontal or oblique asymptotes and then be sure to discuss the functions range, domain, intercepts. Sketch a graph of the function. $R(x) = \frac{1}{x^2 + 4x + 4}$ Example: Find the real zeros, the vertical asymptotes, and the end behavior model for $f(x) = \frac{30}{x} + \frac{90}{x+20}$ http://education.ti.com (Keyword Search: Investigation of End Behavior)
2.7 Graphs of Rational Functions	PC-3.8 PC-3.9	Slant (Oblique) Asymptotes	In text, p. 160: #92

- PC-3.10 and PC-3.11 are not covered in this textbook. Must use resource such as Precalculus with Limits (CP Precalculus text) Larson 2nd Edition , **Section 2.7 NonLinear Inequalities** pp. 194-203.
- In text, Appendix C (C.4 – Solving Inequalities Algebraically and Graphically)

Chapter 3: Exponential and Logarithmic Functions
Timeline: 15 days

2007 Standards

Standard PC-1: The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation.

PC-1.4 Judge the reasonableness of mathematical solutions.

PC-1.6 Understand how algebraic and trigonometric relationships can be represented in concrete models, pictorial models, and diagrams.

Standard PC-2: The student will demonstrate through the mathematical processes an understanding of the characteristics and behaviors of functions and the effect of operations on functions.

PC-2.4 Carry out procedures to algebraically solve equations involving parent functions or transformations of parent functions (including $y = x^n$, $y = \log_a x$, $y = \ln x$, $y = \frac{1}{x}$, $y = e^x$, $y = a^x$, $y = \sin x$, $y = \cos x$, $y = \tan x$, $y = \csc x$, $y = \sec x$, and $y = \cot x$).

Standard PC-4: The student will demonstrate through the mathematical processes an understanding of the behaviors of exponential and logarithmic functions.

PC-4.1 Carry out a procedure to graph exponential functions by analyzing intercepts and end behavior.

PC-4.2 Carry out a procedure to graph logarithmic functions by analyzing intercepts and end behavior.

PC-4.3 Carry out procedures to determine characteristics of exponential functions (including domain, range, intercepts, and asymptotes).

PC-4.4 Carry out procedures to determine characteristics of logarithmic functions (including domain, range, intercepts, and asymptotes).

PC-4.5 Apply the laws of exponents to solve problems involving rational exponents.

PC-4.6 Analyze given information to write an exponential function that models a given problem situation.

PC-4.7 Apply the laws of logarithms to solve problems.

PC-4.8 Carry out a procedure to solve exponential equations algebraically.

PC-4.9 Carry out a procedure to solve exponential equations graphically.

PC-4.10 Carry out a procedure to solve logarithmic equations algebraically.

PC-4.11 Carry out a procedure to solve logarithmic equations graphically.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
3.1 Exponential Functions and Their Graphs	PC-4.1 PC-4.3 PC-4.6	Transcendental Functions Exponential Function Natural Base	In text, p. 191: #73

		Common Base Compound Interest Radioactive Decay	Example: Solve for x in the following equations: a. $e^{-x^2} = (e^x)^2 \bullet \frac{1}{e^3}$ b. $8^{x^2-2x} = \frac{1}{2}$ c. If $4^x = 7$ then what does 4^{-2x} equal? Example: A model for the number of people N in a high school community who have heard a certain rumor is: $N = P(1-e^{-0.15d})$ where P is the total population of the community and d is the number of days that have elapsed since the rumor began. In a community of 1500 students, how many students will have heard the rumor after 4 days?
3.2 Logarithmic Functions and Their Graphs	PC-4.2 PC-4.4	Logarithmic Function Common Logarithmic Function Natural Logarithmic Function	In text, p.199: #113 Example: Solve each of the equations for the *x* variable. a. $\log_4 64 = x$ b. $\ln e^x = 5$ c. $\log_6 36 = 5x + 3$ d. $\log_x (\frac{1}{8})=3$

			Example: Determine range and domain and also state the equation of the vertical asymptote of each function below: a. $\ln(4-x)=h(x)$ b. $3+\log(4-x)=f(x)$ c. $2-\ln x=g(x)$ Example: Solve for the following equation using the laws of exponents. $e^{\frac{1}{x}}=4$ Example: Solve $\log_2 x=\frac{3}{2}$ algebraically and graphically. Example: a. Simplify $16^{\frac{1}{4}},\ 16^{-\frac{1}{4}},\ 8^{\frac{2}{3}},\ 8^{-\frac{2}{3}}$. b. Solve: $9^{x+1}=\sqrt{27}$ c. A house bought five years ago for \$100,000 was just sold for \$135,000. To the nearest tenth of a percent, what was the annual growth rate?
3.3 Properties of Logarithms	PC-4.7	Change-of-Base Formula Product Property Quotient Property Power Property	In text, p. 208: #108 Example: Express as a single logarithm $21\log_3 \sqrt[3]{x}+\log_3\left(9x^2\right)-\log_3 9$ Example: Use the change-of-base theorem to evaluate $\log_3 12$ to the nearest hundredth.

3.4 Exponential and Logarithmic Equations	PC-1.4 PC-2.4 PC-4.5 PC-4.8 PC-4.9 PC-4.10 PC-4.11	Extraneous Solutions	In text, p.219: #148 Example: Solve each equation. a. $\log_4(x+2) = \log_4 8$ b. $\ln x + \ln(x+2) = 4$ c. $2^x = 10$ d. $e^{x+3} = \pi$
3.5 Exponential and Logarithmic Models	PC-1.6	**Only Required to Cover:** Exponential Growth/Decay Models Logistic Growth Model	In text, p.231: #43 Example: You invest $2000 for 10 years with no withdrawals. Find the value of your investment given a. 5 % compounded monthly? b. 6 % compounded continuously? http://education.ti.com (Keyword Search: Domain & Range) http://education.ti.com (Keyword Search: Accelerated Returns) http://education.ti.com (Keyword Search: Can You Hear Me Now?) Use formula: a. $P = A(1+\frac{r}{n})^{nt}$ b. $P = Ae^{rt}$ Example: How long will it take for an investment to double in value if it earns 5% compounded continuously? Use formula: $P = Ae^{rt}$

Chapter 4: Trigonometric Functions
Timeline: 12 days

2007 Standards

Standard PC-1: The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation.

PC-1.2 Connect algebra and trigonometry with other branches of mathematics.
PC-1.6 Understand how algebraic and trigonometric relationships can be represented in concrete models, pictorial models, and diagrams.

Standard PC-5: The student will demonstrate through the mathematical processes an understanding of the behaviors of trigonometric functions.

PC-5.1 Understand how angles are measured in either degrees or radians.
PC-5.2 Carry out a procedure to convert between degree and radian measures.
PC-5.4 Carry out a procedure to graph trigonometric functions by analyzing intercepts, periodic behavior, and graphs of reciprocal functions.
PC-5.5 Carry out procedures to determine the characteristics of trigonometric functions (including domain, range, intercepts, and asymptotes).
PC-5.6 Apply a procedure to evaluate trigonometric expressions.
PC-5.7 Analyze given information to write a trigonometric function that models a given problem situation involving periodic phenomena.
PC-5.8 Analyze given information to write a trigonometric equation that models a given problem situation involving right triangles.
PC-5.13 Apply a procedure to graph the inverse functions of sine, cosine, and tangent.
PC-5.15 Carry out a procedure to compute the slope of a line when given the angle of inclination of the line.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
4.1 Radian and Degree Measure	PC-5.1 PC-5.2	Initial Side Terminal Side Vertex Standard Position Positive/Negative Angles Coterminal Measure of an Angle Central Angle Radian Acute Obtuse Complementary	In text, p.263: #106 Which of the pairs represent coterminal angles? a. $\frac{\pi}{2}, -\frac{3\pi}{2}$ b. $45°, -315°$ c. $100°, -100°$ d. $\frac{2\pi}{5}, -\frac{8\pi}{5}$

		Supplementary Degree Arc Length of a Sector Area of a Sector	Example: Convert each angle in radians to degrees. a. $\frac{5\pi}{6}$ b. $\frac{\pi}{2}$ c. $\frac{-3\pi}{4}$ Example: Find the exact value of the following trigonometric expressions: a. $\tan(4\pi)$ b. $\csc\frac{11\pi}{2}$ c. $\sec 8\pi$
4.2 Trigonometric Functions: The Unit Circle **4.3 Right Triangle Trigonometry** **4.4 Trigonometric Functions of Any Angle** **4.5 Graphs of Sine and Cosine Functions** **4.6 Graphs of Other Trigonometric Functions**	PC-5.4 PC-5.5 PC-5.6 PC-5.7 PC-5.8 PC-5.15	Unit Circle Period of a Function Even/Odd Trigonometric Functions Reference Angle Key Points Amplitude Phase Shift Hypotenuse Opposite Side Adjacent Side Reciprocal Identities Quotient Identities Pythagorean Identities Angle of Elevation Angle of Depression	In text, p.271: #75 (Section 4.2) In text, p.282: #81 (Section 4.3) In text, p.291: #125 (Section 4.4) In text, p.301: #83 (Section 4.5) In text, p.313: #65 (Section 4.6) Example: Use the fact that the trigonometric functions are periodic to find the exact value of each of the four remaining trigonometric functions (non-calculator). a. $\sin\theta = \frac{-3}{5}$ and $\cos\theta = \frac{4}{5}$ b. $\sin\theta = \frac{\sqrt{3}}{2}$ and $\cos\theta = \frac{1}{2}$

			Example: Use properties of trigonometric function to find the exact value of each expression. (non-calculator) a. $\sin^2 40^o + \cos^2 40^o$ b. $\tan 40^o - \dfrac{\sin 40^o}{\cos 40^o}$ c. $\cos 400^o \bullet \sec 40^o$ Example: Determine the amplitude and period of each function. Discuss the range, domain, intercepts of each function and graph the function. a. $f(x) = -4\cos(2x)$ b. $g(x) = \dfrac{4}{3}\sin(\pi x - \dfrac{\pi}{2}) + 1$ c. $h(x) = 2\cos(4x + 3\pi) - 1$
4.7 Inverse Trigonometric Functions	PC-5.13	Inverse Trig Functions Arcsine, Arccosine, Arctangent	In text, p.324: #100 Example: Sketch the graph of the following inverse functions, state the domain and range of each. a. $f(x) = \sin^{-1} x$ b. $g(x) = \tan^{-1} x$ *c.* $h(x) = \cos^{-1} x$
4.8 Applications and Models	PC-1.2 PC-1.6	Right Triangle Trigonometry Simple Harmonic Motion	In text, p.334: #43 Example: According to the Old Farmer's Almanac, the number of hours of sunlight in Boston on the summer solstice is 15.283and the number of hours of sunlight on the winter solstice is 9.067. a. Find a sinusoidal function of the form

			$y = A\sin(\omega x - \phi) + B$ that fits the data. b. Use the function found in part(a) to predict the number of hours of sunlight on April 1, the 91st day of the year. c. Draw a graph of the function found in part (a) d. Look up the number of hours of sunlight for April 1 in the Old Farmer's Almanac and compare the actual hours of daylight to the results found in part a. http://education.ti.com (Keyword Search: Vertical and Phase Shifts)

Chapter 5: Analytic Trigonometry
Timeline: 9 days

2007 Standards

Standard PC-1: The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation.

Standard PC-5: The student will demonstrate through the mathematical processes an understanding of the behaviors of trigonometric functions.

PC-5.10 Carry out a procedure to solve trigonometric equations algebraically.

PC-5.11 Carry out a procedure to solve trigonometric equations graphically.

PC-5.14 Apply trigonometric relationships (including reciprocal identities; Pythagorean identities; even and odd identities; addition and subtraction formulas of sine, cosine, and tangent; and double angle formulas) to verify other trigonometric identities.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
5.1 Using Fundamental Identities **5.2 Verifying Trigonometric Identities**	PC-5.14	Reciprocal Identities Quotient Identities Pythagorean Identities Even/Odd Identities	Example: Use algebraic techniques to prove each identity. a. $\sec\theta \bullet \sin\theta = \tan\theta$ b. $(\csc\theta + \cot\theta)(\csc\theta - \cot\theta) = 1$ c. $\frac{\cos^2\theta - \sin^2\theta}{1 - \tan^2\theta} = \cos^2\theta$
5.3 Solving Trigonometric Equations	PC-5.10 PC-5.11 PC-5.14		In text, p.374: #95 Example: Solve each equation on the interval $0 \le \theta < 2\pi$ algebraically. Justify your answers graphically. a. $4\cos^2\theta = 1$ b. $\tan\theta + 1 = 0$ c. $5\csc\theta - 3 = 2$ d. $1 - \cos\theta = \frac{1}{2}$

			Example: Use a graphing utility to solve each equation on the interval $0 \le \theta < 2\pi$. Round answers to two decimal places. a. $\sin\theta = 0.4$ b. $\tan\theta = 5$ c. $\csc\theta = -3$
5.4 Sum and Difference Formulas **5.5 Multiple-Angle and Product-To-Sum Formulas**	PC-5.14	Double-Angle Formulas Half-Angle Formulas	Condense and simplify. a. $\sin 20^o \cos 10^o + \cos 20^o \sin 10^o$ b. $\cos\frac{5\pi}{12}\cos\frac{7\pi}{12} - \sin\frac{5\pi}{12}\sin\frac{7\pi}{12}$

Chapter 6: Additional Topics in Trigonometry
Timeline: 6 days

2007 Standards

Standard PC-1: The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication,

Standard PC-5: The student will demonstrate through the mathematical processes an understanding of the behaviors of trigonometric functions.
PC-5.9 Carry out a procedure to calculate the area of a triangle when given the lengths of two sides and the measure of the included angle.
PC-5.12 Apply the laws of sines and cosines to solve problems.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
6.1 Law of Sines	PC-5.9 PC-5.12	Oblique Triangle AAS- ASA Ambiguous Case (SSA)	In text, p. 411: #42 http://education.ti.com (Keyword Search: Ain't No River Wide Enough)
6.2 Law of Cosines	PC-5.12	SSS, SAS	In text, p.418: #52 Example: Find the area of the triangles given the following information: a. $a=3, b=4, \angle C=40^o$ b. $a=2, b=2, c=2$ c. b=4,c=1, $\angle$A=120^o d. $a=2, b=3, c=4$ Use $A=\frac{1}{2}(side_1)(side_2)(\sin\ included\ \angle)$ in problems a and c. For problem b, use the Area of Equilateral Triangle Formula $A=\frac{s^2\sqrt{3}}{4}$. Then use the Law of Cosines to find an included angle and then use $A=\frac{1}{2}(side_1)(side_2)(\sin\ included\ \angle)$. For problem d, use Heron's Formula $A=\sqrt{s(s-a)(s-b)(s-c)}$ where $s=\frac{a+b+c}{2}$. Then use the Law of Cosines to find an included angle and then use $A=\frac{1}{2}(side_1)(side_2)(\sin\ included\ \angle)$. Show areas are equal.

Chapter 9: Topics in Analytic Geometry
Timeline: 8 days

2007 Standards

Standard PC-1: The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation.

Standard PC-5: The student will demonstrate through the mathematical processes an understanding of the behaviors of trigonometric functions.

PC-5.3 Carry out a procedure to plot points in the polar coordinate system.

Standard PC-6: The student will demonstrate through the mathematical processes an understanding of the behavior of conic sections both geometrically and algebraically.

PC-6.1 Carry out a procedure to graph the circle whose equation is the form $(x-h)^2+(y-k)^2=r^2$.

PC-6.2 Analyze given information about the center and the radius or the center and the diameter to write an equation of a circle.

PC-6.3 Apply a procedure to calculate the coordinates of points where a line intersects a circle.

PC-6.4 Carry out a procedure to graph the ellipse whose equation is the form $\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1.$

PC-6.5 Carry out a procedure to graph the hyperbola whose equation is the form $\frac{(x-h)^2}{a^2}-\frac{(y-k)^2}{b^2}=1.$

PC-6.6 Carry out a procedure to graph the parabola whose equation is the form $y-k=a(x-h)^2$.

Textbook Correlations	Standard	Vocabulary	Resources/Examples
9.1 Conics: Circles and Parabolas	PC-6.1 PC-6.2 PC-6.6	Standard Form of a Circle Radius Center Standard Form of a Parabola	In text, p.645: #100 Example: Draw a graph of the following circle. $(x-3)^2+(y+4)^2=25$ Example: Given a radius = 6 and a center located at the point (4,-3) write the standard form of the equation of the circle. Example: Write the following equation in the standard form of a circle and then graph: $x^2+y^2+2x-4y-4=0$ Circles: converting standard form to center-radius form Circle interactive Example: Find the vertex and two other points of interest for each parabola. Graph (non-calculator). Verify by using a graphing utility. a. $y^2=8x$ b. $y^2-2y=8x-1$ c. $x^2+6x-4y+1=0$ Conic Videos: Parabola
9.2 Ellipses	PC-6.4	Standard Form of an Ellipse	In text, p.654: #57 Example: Find an equation for the ellipse with a center at $(2,-3)$, one focus at $(3,-3)$ and one vertex at $(5,-3)$, then graph the ellipse.

			Example: Graph the following ellipse (non-calculator). $\frac{(x-2)^2}{9}+\frac{(y+3)^2}{4}=1$
9.3 Hyperbolas and Rotation of Conics	PC-6.5	Standard Form of a Hyperbola	In text, p.667: #54 Example: Graph the following hyperbola (non-calculator). $\frac{(y+3)^2}{4}-\frac{(x-2)^2}{9}=1$ Write the equation of the asymptotes in point-slope form. Example: Find and state the center, transverse axis, vertices and asymptotes for the following hyperbola. Graph the given hyperbola. $x^2-y^2-2x-2y-1=0$
9.5 Polar Coordinates	PC-5.3	Polar Coordinate System Pole Polar Axis Polar Coordinates	Example: Plot the points $(3,\pi),\left(-2,\frac{\pi}{4}\right),\left(1.5,\frac{-\pi}{2}\right),\left(-\sqrt{3},-\frac{2\pi}{3}\right)$ http://education.ti.com (Keyword Search: Transitions) Polar Graphing- Slider
7.1 Solving Systems of Equations	PC-6.3	System of Equations Graphical Solution	In text, p. 476: #14 In text, p. 478: #84 Eccentricity (Sketchpad) http://education.ti.com (Keyword Search: Nonlinear Systems of Equations)

****For <u>HONORS</u> Precalculus, the following topics are important beyond the standards.****

Honors Concepts: Limits, Sequences and Series, Parametric Equations, Vectors, and Regression Models **Timeline: 20 days**
2007 Standards
Standard PC-1: The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation. PC-1.1 Communicate knowledge of algebraic and trigonometric relationships by using mathematical terminology appropriately. PC-1.2 Connect algebra and trigonometry with other branches of mathematics. PC-1.3 Apply algebraic methods to solve problems in real-world contexts. PC-1.4 Judge the reasonableness of mathematical solutions. PC-1.5 Demonstrate an understanding of algebraic and trigonometric relationships by using a variety of representations (including verbal, graphic, numerical, and symbolic). PC-1.6 Understand how algebraic and trigonometric relationships can be represented in concrete models, pictorial models, and diagrams. PC-1.7 Understand how to represent algebraic and trigonometric relationships by using tools such as handheld computing devices, spreadsheets, and computer algebra systems (CASs).

<u>Chapter 11 – Limits and an Introduction to Calculus</u> • 11.1 Introduction to Limits • 11.2 Techniques for Evaluating Limits • 11.3 The Tangent Line Problem	Limit/Limit Properties Unbounded/Bounded Behavior Direct Substitution Intermediate Form Rationalizing Technique One-Sided Limits Slope Tangent Line Secant Line Derivative	In text, p. 723: #69 (Section 11.2) In text, p. 779: #71 (Section 11.3) Example: Evaluate (a) $\lim_{x\to 3^+} \frac{1}{x-3}$, (b) $\lim_{x\to 2} \left(x^2-3x+1\right)$ Intro to Limits

Chapter 8 – Sequences, Series, and Probability • 8.1 Sequences and Series • 8.2 Arithmetic Sequences and Partial Sums • 8.3 Geometric Sequences and Series • 8.4 The Binomial Theorem	Infinite/Finite Sequence Terms Factorial ! Recursive Fibonacci Sequence Summation $\sum$ Arithmetic Sequence and Series Common Difference Geometric Sequence and Series Common Ratio Binomial Theorem Coefficient Pascal's Triangle	In text, p.579: #121 (Section 8.1) In text, p. 587: #84 (Section 8.2) In text, p. 597: #104 (Section 8.3) In text, p. 606: #118 (Section 8.4) http://education.ti (Keyword Search: Outbreak!) http://education.ti (Keyword Search: Exploring Geometric Sequences)
Chapter 9 – Topics in Analytic Geometry • 9.4 Parametric Equations	Parameter Plane Curve Orientation Eliminate the Parameter	In text, p. 676: #62 TI: ParametricIntro to Limits and Polar Graph Activities
Chapter 10 – Analytic Geometry in Three-Dimensions • 10.1 – The Three-Dimensional Coordinate System (Plotting Points in Space only) • 10.2 – Vectors in Space • 10.3 - The Cross Product of Two Vectors	x-y-z Plane Magnitude Scalar Multiple Unit Vector Dot Product Parallel Vectors Terminal Point Cross Product	In text, p.723: ##71 (Section 10.2) Finding components Example: Find the unit vector having the same direction as v: $v = i - j$
Regression Models • Section 1.7 – Linear Models and Scatter Plots • Section 2.8 – Quadratic Models • Section 3.6 – Nonlinear Models • Section 4.8 – Applications and Models	Correlation Least Squares Regression Line Correlation Coefficient Linear Regression Coefficient of Determination Exponential Regression Power Regression Logarithmic Regression Logistic Regression Simple Harmonic Motion	In text, p. 79: #25 (Section 1.7) In text, p. 167: #21 (Section 2.8) In text, p. 239: #33 (Section 3.6) In text, p. 337: #68 (Section 4.8)

http://www.CalcChat.com

- Provides free solutions to all odd-numbered exercises in the text.
- Students may visit the site for practice and help with their homework.

http://www.wadsworth.com/cgi-wadsworth/course_products_wp.pl?fid=M20b&product_isbn_issn=9781111427641&token=

- Allows access to the text online.

This website can be used for multiple chapters for activities:
http://apstatsmonkey.com (currently under construction)
***Textbook for CP Stats: Elementary Statistics a step by step approach 8th edition**

Concept: Introduction to Statistics (Chapter 1 and 14)
Timeline: 10 days

2007 Standard(s):

Standard DA-1: The student will use the mathematical process of representation, connection, communication, reasoning and proof, and problem solving.

DA-1.2 Execute procedures to find measures of probability and statistics using tools such as hand-held computing devices, spreadsheets, and statistical software.

DA-1.4 Design and conduct a statistical research project, produce a report, and summarize the findings

DA-1.6 Communicate knowledge of data analysis and probability using mathematical terminology appropriately.

Standard DA-2: The student will demonstrate through the mathematical processes an understanding of the design of a statistical study.

DA-2.1 Classify a data collection procedure as a survey, an observational study, or a controlled experiment

DA-2.2 Compare various random sampling techniques (including simple, stratified, cluster, and systematic).

DA-2.3 Analyze a data-collection procedure to classify the technique used as either simple cluster, systematic, or convenience sampling.

DA-2.4 Critique data collection methods and describe how bias can be controlled or reduced

DA-2.5 Judge which of two or more possible experimental designs will best answer a given research question

DA-2.6 Generate a research question and design a statistical study to answer the research question

Standard DA-4: The student will demonstrate through the mathematical processes an understanding of basic statistical methods of analyzing data.

DA-4.2 Compare descriptive and inferential statistics.

DA-4.3 Classify a variable as discrete or continuous and as either categorical or quantitative.

Textbook Section	Standard	Vocabulary	Resources/examples
1.1 Descriptive and Inferential Statistics 1.2 Variables and Types of Data 1.3 Data collection and sample techniques 1.4 Observational and experimental studies 1.5 Uses and misuses of statistics 1.6 Computers and calculators 14.1 Common Sampling techniques 14.2 Surveys and Questionnaire design 14.3 Simulation Techniques	DA-1.2 DA-1.6 DA-2.1 DA-2.2 DA-2.3 DA-2.4 DA-2.5 DA-2.6 DA-4.2 DA-4.3	Cluster sample Confounding variable Continuous variable Control group Convenience sample Data Data set Data value or datum Dependent variable Descriptive statistics Discrete variable, Experimental study Explanatory variable Hawthorne effect Hypothesis testing Independent variable Inferential statistics Interval level of measurement Measurement scale Nominal level of measurement Observational study Ordinal level of measurement Outcome variable Population Probability Qualitative variable Quantitative variable Quasi-experimental study	The POWERMUTT Project This website contains notes for students who may need extra help. Who Am I? - Collect the data first week of school. Use the information as an ice breaker. Have the students keep the data sheets they used the first day for this activity. Cookie lab Statistics Tutorial: Simple Random Sampling – can be used for students who are having trouble with this section Data Collection-Census http://nnlm.gov/evaluation/workshops/measuring_your_impact/DataCollectionHandout.pdf http://www.prm.nau.edu/prm447/methods_of_data_collection_lesson.htm Example: A statistics student at Grand Morris State College found that of the 1260 adults surveyed that lived near the college, 44.8% of them ate in fast-food restaurants from one to two times a week A. Is the variable quantitative or qualitative? B. Would this be considered an example of

		Random sample Random variable Ratio level of measurement Sample Statistics Stratified sample Systematic sample Treatment group Variable	descriptive or inferential statistics? C. What is the implied population? Example: Discuss which technique of data collection you think was used in the following study and comment on how believe the study controlled possible bias. A. An ecology class used binoculars to watch 20 turtles at Rowland Pond. It was found that 15 were box turtles and five were snapping turtles. B. The New York State division of Wildlife caught 21 male deer (put a monitor on them) and gave each one an injection to prevent heart worm. A year later 13 of the 15 deer they recaptured did not have heartworms, while the others did.

Concept: Organizing Data (Chapter 2)
Timeline: 5 days

Standard:

Standard DA-1: The student will use the mathematical process of representation, connection, communication, reasoning and proof, and problem solving.

DA-1.7 Judge the reasonableness of solutions based on the source of the data, the design of the study, the way the data is displayed, and the way the data is analyzed

DA-1.8 Compare data sets using graphs and summary statistics

Standard DA-3: The student will demonstrate through the mathematical processes an understanding of the methodology for collecting, organizing, displaying, and interpreting data

DA-3.2 Organize and interpret data by using pictographs, bar graphs, pie charts, dot plots, histograms, time-series plots, stem-and-leaf plots, box-and-whiskers plots, and scatter plots.

DA-3.3 Select appropriate graphic display(s) from among pictographs, bar graphs, pie charts, dot plots, histograms, time-series plots, stem-and-leaf plots, box-and-whiskers plots, and scatter plots when given a data set or problem situation.

DA-3.4 Represent frequency distributions by using displays such as categorical frequency distributions/Pareto charts, histograms, frequency polygons, and cumulative frequency distributions/ogives.

Standard DA-4: Through the process standards the student will demonstrate an understanding of basic statistical methods of analyzing data.

DA-4.8 Classify a distribution as symmetric, positively skewed, or negatively skewed.

DA-4.9 Explain the significance of the shape of the distribution

Textbook Sections	Standard	Vocabulary	Resources/Examples
2.1 Organizing Data 2.2 Histograms, Frequency Polygons, and Ogives 2.3 Other types of graphs	DA-1.7 DA-1.8 DA-3.2 DA-3.3 DA-3.4 DA-4.8 DA-4.9	Bar graph Categorical frequency distribution Class Class boundaries Class midpoint Class width Cumulative frequency Cumulative frequency distribution Frequency Frequency distribution Frequency polygon Grouped frequency distribution Histogram Lower class limit Ogive Open-ended distribution Pareto chart Pie graph Raw data Relative frequency graph Stem and leaf plot	Baseball Stats Data http://www.november.org/graphs/ This site contains numerous graphs about the prison systems. Don't use the "State by State Corrections" link. The page has moved! http://www.infoplease.com/edu/colleges/sc.html Use different graphical representations to illustrate various segments of the data. Tools for Displaying Data http://wiki.stat.ucla.edu/socr/index.php/SOCR_Data_Dinov_020108_HeightsWeights Data: 25,000 heights and weights Example: *Fortunate* magazine reported some interesting housekeeping secretes. When unexpected company comes, where do we hide the mess? 68% respondents toss their mess in the closet, 23% shove

		Time series graph Ungrouped frequency distribution Upper class limit	things under the bed, 6% put things in the bathtub, and 3% put the mess in the freezer. Make a circle graph and/or ogive to display this information. Example: The heights at different ages of boys change as they get older. Construct a time-series plot using the following data: Age (years): 3 4 5 6 7 Height (in.): 36 39 42 45 47 Age (years): 8 9 10 11 12 Height (in.): 50 52 54 56 58

Concept: Averages and Variation (Chapter 3)
Timeline: 10 days

Standards:

Standard DA-1: The student will use the mathematical process of representation, connection, communication, reasoning and proof, and problem solving.

DA-1.5: Apply the principles of probability and statistics to solve problems in real-world contexts

Standard DA-4: The student will demonstrate through the mathematical processes an understanding of basic statistical methods of analyzing data.

DA-4.4: Use procedures and/or technology to find measures of central tendency (mean, median, mode) for given data
DA-4.5: Predict the effect of transformations of data on measures of central tendency, variability, and the shape of the distribution
DA-4.6: Use procedures and/or technology to find measures of spread (range, variance, standard deviation, interquartile range, and outliers) for given data
DA-4.7: Use procedures and/or technology to find measures of position (including median, quartiles, percentiles, standard scores) for given data
DA-4.8: Classify a distribution as symmetric, positively skewed, or negatively skewed
DA-4.11: Use control charts to determine if a process is in control

Textbook Section	Standard	Vocabulary	Resources / Examples

3.1 Measures of central tendency 3.2 Measures of variation 3.3 Measures of position 3.4 Exploratory data analysis	DA-1.5 DA-4.4 DA-4.5 DA-4.6 DA-4.7 *DA-4.11 control chart	Bimodal Boxplot Chebyshev's Theorem Coefficient of variation Data array Decile Empirical rule Exploratory data analysis (EDA) Five-number summary Inter-quartile range (IQR) Mean Median Mode Midrange Modal class Multimodal Negatively skewed or left-skewed Outlier Parameter Percentile Positively or right-skewed Quartile Range Range rule of thumb Resistant statistic Standard deviation Statistic Symmetric distribution Unimodal Variance Weighted mean z-score or standard score	Mean, Median, Mode, Range Data Practice (Learning Check) HSAP practice with TI Navigator The Fujita Scale Baseball Data http://wiki.stat.ucla.edu/socr/index.php/SOCR_Data_Dinov_020108_HeightsWeights http://www.nku.edu/~statistics/212_Using_the_Empirical_Rule.htm http://www.regentsprep.org/regents/math/algebra/AD3/boxwhisk.htm Example: The annual salaries for 11 people who work at Beanbridge National Bank are listed below. (in thousands of dollars) A. Compute the mean, median and mode of all 11 salaries. B. Omit the salaries of the president and vice president. Calculate the mean and median for the remaining 9 people. C. Which measure of central tendency best describes salaries at Beanbridge bank. President: 90 Vice President: 80 Tellers: 15, 25, 18, 22, 18, 19, 20, Secretaries: 13, 14 Example: Compute the sample mean, sample variance,

			sample standard deviation for the mortality rate of trout caught and released using artificial flies with barbed hook based on data collected from regions in Montana, New York, Illinois, Wyoming, Utah: Percent Mortality: 2.9 6.3 1.8 Number of Fish: 145 270 224 Percent Mortality: 4.7 3.2 Number of Fish: 271 69

Concept: Probability Theory (Chapter 4)
Timeline: 10 days

Standard:

Standard DA-1: The student will use the mathematical processes of representation, connection, communication, reasoning and proof, and problem solving.

DA-1.1: Execute procedures to conduct simple probability experiments and collect data using manipulatives including spinners, dice, cards, and coins.

DA-1.3: Execute procedures to conduct a simulation using random number tables and/or technology including hand-held computing devices and computers.

Standard DA-3: The students demonstrate an understanding of how to collect, organize, display, and interpret data.

DA-3.1: Use manipulatives, random number tables, and technology to collect data and conduct experiments and simulations.

Standard DA-4: The student will demonstrate an understanding of basic statistical methods of analyzing data.

DA-4.10: Use knowledge of Empirical Rule to solve problems involving data that is normally distributed.

Standard DA-5: The student will demonstrate through the mathematical processes an understanding of the basic concepts of probability.

DA-5.1: Construct a sample space for an experiment and represent it as a list, chart, picture, or tree diagram.
DA-5.2: Use counting techniques to determine the number of possible outcomes of an event.
DA-5.3: Classify events as dependent or independent.
DA-5.4: Categorize two events as mutually exclusive or not mutually exclusive.
DA-5.5: Use the concept of complementary sets to compute probabilities.
DA-5.7: Carry out a procedure to compute simple probabilities and compound probabilities including conditional probabilities.
DA-5.9: Compare theoretical and experimental probabilities.

Textbook section	Standard	Vocabulary	Resources / examples
4.1 Sample spaces and probability 4.2 The Addition Rules of probability 4.3 The Multiplication Rules and Conditional probability 4.4 Counting rules 4.5 Probability and counting rules	DA-1.1 DA-1.3 DA-3.1 DA-4.10 DA-5.1 DA-5.2 DA-5.3 DA-5.4 DA-5.5 DA-5.7 DA-5.9	Classical probability Combination Complement of an event Compound event Conditional probability Dependent events Empirical probability Equally likely events Event Fundamental counting rule Independent events Law of large numbers Mutually exclusive events Outcome Permutation Probability Probability experiment Sample space Simple event	http://www.khanacademy.org/#browse This website contains links for probability and statistics. You will need to scroll through to find what you need. Favorite M&M Data Find Probability More Probability http://www.npr.org/templates/transcript/transcript.php?storyId=7320273 http://wiki.stat.ucla.edu/socr/index.php/SOCR_EduMaterials Example: Valerie runs a basket making store. Yesterday she counted 127 people who walked by her store, 58 of whom came into the store. Of the 58, only 25 bought something in the store.

<table>
<tr>
<td></td>
<td></td>
<td>Subjective probability
Tree diagram
Venn diagram</td>
<td>
A. Estimate the probability that a person who walks by the store will enter the store.
B. Estimate the probability that a person who walks into the store will buy something.
C. Estimate the probability that a person who walks by the store will come in and buy something.
D. Estimate the probability that a person who comes into the store will buy nothing.

Example: At Histirck Tool Shop, all 140 employees were asked about their political affiliation. The employees were grouped by type of work, as executives or production workers. The results are shown in the two way table below:
Political Affiliation
<table>
<tr><td>Type</td><td>D</td><td>R</td><td>I</td></tr>
<tr><td>E</td><td>5</td><td>34</td><td>9</td></tr>
<tr><td>W</td><td>63</td><td>21</td><td>8</td></tr>
<tr><td>Total</td><td>68</td><td>55</td><td>17</td></tr>
</table>
Let: E=Executive, PW=Production Worker, D=Democrat, R=Republican, I=Independent
A. Compute P(D) and P(E)
B. Compute P(D given E)
C. Are the events D and E independent?
D. Compute P(D and E)
E. Compute P(D or E)
Example: You toss a pair of dice.
A. Use the multiplication rule of counting to determine the number of possible pair of outcomes.
B. There are three even numbers on each die. How many outcomes are possible with even numbers appearing on each die? Create a tree
</td>
</tr>
</table>

			diagram to visually represent your solution. C. What is the probability that both dice will show an even number?

Concept: Discrete Probability Distributions (Chapter 5)
Timeline: 15 days

Standard:

Standard DA-1: The student will use the mathematical process of representation, connection, communication, reasoning and proof, and problem solving.

DA-1.5: Apply the principles of probability and statistics to solve problems in real world contexts.
DA-1.6: Communicate knowledge of data analysis and probability using mathematical terminology appropriately.

Standard DA-5: The student will demonstrate through the mathematical processes an understanding of the basic concepts of probability.

DA-5.6: Use the binomial probability distribution to solve problems
DA-5.8: Use a procedure to find the geometric probability in real world contexts
DA-5.10: Construct and compare theoretical and experimental probability distributions
DA-5.11: Use procedures to find the expected value of discrete random variables and construct meaning within contexts.
DA-5.12: Understand the law of large numbers

Textbook section	Standard	Vocabulary	Examples/resources
5.1 Probability Distributions 5.2 Mean, Variance, Standard Deviation, and Expectation 5.3 The Binomial Distribution 5.4 Other types of Distributions	DA-1.5 DA-1.6 DA-5.6 DA-5.8 DA-5.10 DA-5.11 DA-5.12	Binomial distribution Binomial experiment Discrete probability distribution Expected value Hypergeometric distribution Multinomial distribution Poisson distribution Random variable	http://www.computing.dcu.ie/~wuhai/chap05.pdf http://stattrek.com/Lesson1/Statistics-Intro.aspx?Tutorial=Stat (probability tutorial) Data Sets http://regentsprep.org/Regents/math/algtrig/ATS7/BPrac.htm Example: Which of the following are continuous variables and which are discrete?

			A. Speed of an airplane. B. Age of a college professor chosen at random C. Number of books in the college bookstore D. Weight of a football player chosen at random Example: Radcliff Heights University published a claim that 70% of all single men would welcome women taking the initiative in asking for a date. A random sample of 36 single men was asked if they would welcome a women asking for a date. Find the following probabilities: A. At least 18 of the men will say yes. B. Fewer than 3 of the men will say yes. C. None of the men will say yes. D. At least 5 of the men will say no. Examples: Rico is taking Calculus this semester on a pass/fail basis. The department teaching the course has a history of passing 75% of the students in each term. Let n= 1, 2, 3… represent the number of times a student takes Calculus until the first passing grade is received. (Assume the trials are independent) A. Write out a formula for the probability distribution of the random variable n. *(Part B through E you may use a calculator to solve the probabilities)* B. What is the probability that Rico passes on the first try? C. What is the probability that Rico first passes on the second try? (n=2) D. What is the probability that Rico needs three or more tries to pass Calculus? E. What is the expected number of attempts at Calculus Rico must make to have his (first) pass?

Concept: Normal Distribution (Chapter 6)
Timeline: 10 days

Standard:

Standard DA-1: The student will use the mathematical process of representation, connection, communication, reasoning and proof, and problem solving.

DA-1.2 Execute procedures to find measures of probability and statistics using tools such as hand held computing devices, spreadsheets, and statistical software
DA-1.5: Apply the principles of probability and statistics to solve problems in real world contexts.
DA-1.6: Communicate knowledge of data analysis and probability using mathematical terminology appropriately.

Standard DA-4: The student will demonstrate an understanding of basic statistical methods of analyzing data.

DA-4.7 Use procedures and/or technology to find measures of position (including median, quartiles, percentiles, standard scores) for given data.
DA-4.8 Classify a distribution as symmetric, positively skewed, or negatively skewed
DA-4.9 Explain the significance of the shape of the distribution
DA-4.10 Use knowledge of the Empirical Rule to solve problems involving data that is distributed normally

Textbook Sections	Standards	Vocabulary	Resources/ Examples
6.1 Normal Distributions 6.2 Applications of the Normal Distribution 6.3 The Central Limit Theorem 6.4 The Normal Approximation to the Binomial Distribution (optional)	DA-1.2 DA-1.5 DA-1.6 DA-4.7 DA-4.8 DA-4.9 DA-4.10	Central Limit Theorem Correction for continuity Negatively or left-skewed distribution Normal distribution Positively or right-skewed distribution Sampling distribution of sample means Sampling error Standard error of the mean Standard normal distribution Symmetric distribution z-score	Ketchup Control http://www.amstat.org/publications/jse/essd_activities.html Examples: A vending machine automatically pours coffee into cups. The amount of coffee dispensed into a cup is normally distributed with mean of 7.5 oz and standard deviation of 0.5 oz. A. Estimate the probability that the machine ill overflow an 8-oz cup. B. Estimate the probability that the machine will not overflow an 8-oz cup. C. The machine has just been loaded with 850 cups. How many of these do you expect will overflow when served?

			Examples: The National High School Physical Education Department offered an online Advanced First Aid course for credit during the fall semester. The scores on the comprehensive final exam were normally distributed and the z scores for some of the students are shown: Lee 1.10 Ron 1.70 Doug -2.00 Sally 0.00 Lucy -0.80 Yao 1.60 A. Which of these students scored above the mean? B. Which of these students scored on the mean? C. Which of these students scored below the mean? D. If the mean score was 150 with a standard deviation of 20, what was the final exam score for each student? The heights of 18 year old men are approximately normally distributed, with mean 68 inches and standard deviation 3 inches. a) What is the probability that an 18 year old man selected at random is between 67 and 69 inches tall? b) If a random sample of 9 18 year old men is selected, what is the probability that the mean height is between 67 and 69 inches?

Concept: Regression and Correlation (Chapter 10)
Timeline: 10 days

Standard:

Standard DA-1: The student will use the mathematical process of representation, connection, communication, reasoning and proof, and problem solving.

DA-1.4: Design and conduct a statistical research project, produce a report, and summarize the findings.

DA-1.7 Judge the reasonableness of solutions based on the source of the data, the design of the study, the way the data is displayed, and the way the data is analyzed

DA-1.8 Compare data sets using graphs and summary statistics

Standard DA-3: The student will demonstrate through the mathematical processes an understanding of the methodology for collecting, organizing, displaying, and interpreting data.

DA-3.5: Classify the shape of a scatter plot (including linear, quadratic, or exponential)
DA-3.6: Classify graphically and analytically the correlation between two variables as positive, negative, or no correlation
DA-3.7: Carry out a procedure to determine an equation for a trend line for a scatter plot exhibiting a linear pattern by using visual approximation
DA-3.8: Carry out a procedure to determine a line of best fir for a scatter plot exhibiting a linear pattern by using technology
DA-3.9: Explain the meaning of the correlation coefficient, r
DA-3.10: Use interpolation or extrapolation to predict values based on relationship between two variables.

Textbook section	standard	Vocabulary	Resources / Examples
10.1 Scatter plots and correlation 10.2 Regression 10.3 Coefficient of determination and standard error of the estimate (optional)	DA-1.4 DA-1.7 DA-1.8 DA-3.5 DA-3.6 DA-3.7 DA-3.8 DA-3.9 DA-3.10	Correlation Regression Simple relationship Independent variable Dependent variable Multiple relationship Positive relationship Negative relationship Scatter plot Correlation coefficient Population correlation coefficient Lurking variable Regression line Line of best fit Marginal change Extrapolation Influential points Interpolation	Step by Step Line of Best Fit SAT State Data Making Census Regression Project Ideas Correlation Project Idea Example: Let x be the magnitude of an earthquake (on Richter scale) and let y be the depth (in km) of the quake below the surface at the epicenter. x: 2.9 4.2 3.3 4.5 2.6 3.2 3.4 y: 5.0 8.9 9.9 6.7 4.4 3.9 5.5 A. Draw a scatter diagram for the given data. Discuss the visual shape of the plot and estimate an equation of the trend line. B. Draw a straight line that you think best fits the

			data. C. Discuss the correlation of the line of best fit. (be specific to direction and meaning) Examples: Find the least-squares regression line for the following data and utilize interpolation and extrapolation to solve the questions below. Let x= weight of a car (hundreds of pounds) Let y= miles per gallon (mpg) x: 27 44 32 47 23 40 34 52 y: 30 17 22 11 31 15 20 14 A. Draw a scatter diagram for the following data. B. Find the equation of the least-squares regression line. C. Graph the LSRL on the scatter plot. D. Suppose that a car weighs 38 (hundred pounds) what does the least-squares regression line forecast for y= mpg? E. Suppose that a car weighs 54 (hundred pounds) what does the least-squares regression line forecast for y= mpg? F. Is it safe to use extrapolation within the study of statistics? Find the correlation coefficient and coefficient of determination values and summarize in writing their importance in context of this problem.

Chapters 7 and 8 are optional
Concept: Confidence Intervals and Hypothesis Testing (Chapters 7 and 8)
Timeline: 10 days

Textbook sections	Standards	Vocabulary	Examples of Essential Tasks
7.1 Confidence Intervals for the mean when population standard deviation is known 7.2 Confidence Intervals for the mean when population standard deviation is not known 7.3 Confidence intervals and sample size for proportions 7.4 Confidence intervals for variance and standard deviation		Assumptions Chi-square distribution Confidence interval Confidence level Consistent estimator Degrees of freedom Estimation Estimator Interval estimate Margin of error Point estimate Proportion Relatively efficient estimator Robust t-distribution unbiased estimator	http://stattrek.com/AP-Statistics-4/Confidence-Interval.aspx?Tutorial=Stat (tutorial) http://www.youtube.com/watch?v=Q6Lj_8yt4Qk&feature=fvwrel A random sample of 32 gas grills has a mean price of $630.90 and a standard deviation of $56.70. Construct a 90% confidence interval for the population mean. The manager of the dairy section of a large supermarket took a random sample of 250 eggs and found that 40 cartons had at least one broken egg. Find a 90% confidence interval for *p*. A lawn mower manufacturer is trying to determine the standard deviation of the life of one of its lawn mower models. To do this, it randomly selects 12 lawn mowers that were sold several years ago and finds that the sample standard deviation is 3.25 years. Use a 99% level of confidence.
8.1 Steps in Hypothesis testing – traditional method 8.2 z-test for the mean 8.3 t-test for the mean 8.4 z-test for a proportion 8.5 Chi-squared test for variance and standard deviation 8.6 Additional topics regarding hypothesis testing (optional)		Alpha Alternative hypothesis Beta Chi-square test Critical (or rejection) region Critical value Hypothesis testing Left-tailed test Level of significance Power of a test p-value research hypothesis right-tailed test statistical hypothesis statistical test test value	The body weight of a healthy 3-month-old colt should be able 60 kg. You want to set up a statistical test to challenge the claim that the average weight is 60 kg. A company that makes cola drinks states the mean caffeine content per one 12-ounce bottle of cola is 40 mg. Suppose you work as a quality control manager and are asked to verify this claim. During your tests, you find that a random sample of thirty 12-ounce bottles of cola has a mean caffeine content of 39.2 mg and a standard deviation of 35 mg. At a 5% level of significance, do you have enough evidence to reject the shop's claim? a) Write the null and alternate hypotheses b) Find the critical values and identify the rejection regions c) Find the standardized test statistic d) Decide whether to reject to null hypothesis Interpret the results in the context of the problem

		t-test two-tailed test type I and type II errors z test	

Teacher Note: This College Prep- Data Analysis and Probability consensus map is based on a 90 min block schedule for 90 days. The suggested timeline will take up 80 days, leaving room for individual pacing and review.