

Algebra 2

This course covers the topics shown below.

Students navigate learning paths based on their level of readiness.

Institutional users may customize the scope and sequence to meet curricular needs.

Curriculum (384 topics + 202 additional topics)

- Real Numbers and Linear Equations (82 topics)
 - ◆ Signed Numbers (23 topics)
 - ◇ Ordering integers
 - ◇ Plotting integers on a number line
 - ◇ Integer addition: Problem type 2
 - ◇ Integer subtraction
 - ◇ Signed fraction addition or subtraction: Basic
 - ◇ Signed fraction addition or subtraction: Advanced
 - ◇ Signed decimal addition and subtraction with 3 numbers
 - ◇ Integer multiplication and division
 - ◇ Signed fraction multiplication: Advanced
 - ◇ Order of operations with integers
 - ◇ Exponents and integers: Problem type 1
 - ◇ Exponents and integers: Problem type 2
 - ◇ Exponents and signed fractions
 - ◇ Order of operations with integers and exponents
 - ◇ Evaluating a linear expression: Integer multiplication with addition or subtraction
 - ◇ Evaluating a quadratic expression: Integers
 - ◇ Absolute value of a number
 - ◇ Evaluating expressions with exponents of zero
 - ◇ Evaluating an expression with a negative exponent: Positive fraction base
 - ◇ Evaluating an expression with a negative exponent: Negative integer base
 - ◇ Scientific notation with positive exponent
 - ◇ Scientific notation with negative exponent
 - ◇ Multiplying and dividing numbers written in scientific notation
 - ◆ Properties of Real Numbers (9 topics)
 - ◇ Identifying numbers as integers or non-integers
 - ◇ Identifying numbers as rational or irrational
 - ◇ Distributive property: Whole number coefficients
 - ◇ Distributive property: Integer coefficients
 - ◇ Combining like terms: Integer coefficients
 - ◇ Combining like terms: Advanced
 - ◇ Combining like terms in a quadratic expression
 - ◇ Properties of addition
 - ◇ Properties of real numbers
 - ◆ Linear Equations (17 topics)
 - ◇ Additive property of equality with integers
 - ◇ Additive property of equality with a negative coefficient
 - ◇ Multiplicative property of equality with whole numbers

- ◇ Multiplicative property of equality with integers
- ◇ Multiplicative property of equality with signed fractions
- ◇ Solving a two–step equation with integers
- ◇ Solving a two–step equation with signed fractions
- ◇ Solving a two–step equation with signed decimals
- ◇ Solving a linear equation with several occurrences of the variable: Variables on the same side and distribution
- ◇ Solving a linear equation with several occurrences of the variable: Variables on both sides and fractional coefficients
- ◇ Solving a linear equation with several occurrences of the variable: Variables on both sides and distribution
- ◇ Solving a linear equation with several occurrences of the variable: Variables on both sides and two distributions
- ◇ Solving a linear equation with several occurrences of the variable: Fractional forms with binomial numerators
- ◇ Solving equations with zero, one, or infinitely many solutions
- ◇ Introduction to algebraic symbol manipulation
- ◇ Algebraic symbol manipulation: Problem type 1
- ◇ Algebraic symbol manipulation: Problem type 2
- ◆ Applications of Linear Equations (12 topics)
 - ◇ Writing a one–step variable expression for a real–world situation
 - ◇ Translating a sentence into a one–step equation
 - ◇ Translating a phrase into a two–step expression
 - ◇ Writing a multi–step equation for a real–world situation
 - ◇ Solving a fraction word problem using a linear equation of the form $Ax = B$
 - ◇ Solving a word problem with two unknowns using a linear equation
 - ◇ Solving a decimal word problem using a linear equation of the form $Ax + B = C$
 - ◇ Solving a value mixture problem using a linear equation
 - ◇ Solving a word problem involving rates and time conversion
 - ◇ Solving a distance, rate, time problem using a linear equation
 - ◇ Finding the sale price without a calculator given the original price and percent discount
 - ◇ Finding simple interest without a calculator
- ◆ Linear Inequalities and Applications (12 topics)
 - ◇ Graphing a linear inequality on the number line
 - ◇ Writing an inequality given a graph on the number line
 - ◇ Graphing a compound inequality on the number line
 - ◇ Solving a linear inequality: Problem type 1
 - ◇ Solving a linear inequality: Problem type 2
 - ◇ Solving a linear inequality: Problem type 3
 - ◇ Solving a linear inequality: Problem type 4
 - ◇ Solving a linear inequality: Problem type 5
 - ◇ Solving a compound linear inequality: Graph solution, basic
 - ◇ Writing an inequality for a real–world situation
 - ◇ Writing a multi–step inequality for a real–world situation
 - ◇ Solving a decimal word problem using a two–step linear inequality
- ◆ Absolute Value Equations and Inequalities (4 topics)
 - ◇ Solving an absolute value equation of the form $a|x| = b$ or $|x| + a = b$
 - ◇ Solving an absolute value equation of the form $|ax + b| = c$
 - ◇ Solving an absolute value inequality: Basic
 - ◇ Solving an absolute value inequality: Advanced
- ◆ Geometry (5 topics)
 - ◇ Pythagorean Theorem
 - ◇ Perimeter of a square or a rectangle

- ◇ Area of a square or a rectangle
- ◇ Finding the side length of a rectangle given its perimeter or area
- ◇ Circumference and area of a circle
- Lines and Functions (48 topics)
 - ◆ Ordered Pairs (4 topics)
 - ◇ Reading a point in the coordinate plane
 - ◇ Plotting a point in the coordinate plane
 - ◇ Finding a solution to a linear equation in two variables
 - ◇ Determining whether given points lie on one, both, or neither of 2 lines given equations
 - ◆ Graphing Lines (5 topics)
 - ◇ Graphing a line given its x- and y-intercepts
 - ◇ Graphing a line given its equation in slope-intercept form
 - ◇ Graphing a line given its equation in standard form
 - ◇ Graphing a line through a given point with a given slope
 - ◇ Graphing a vertical or horizontal line
 - ◆ Equations of Lines and Applications (15 topics)
 - ◇ Finding the y-intercept of a line given its equation
 - ◇ Finding x- and y-intercepts of a line given the equation: Advanced
 - ◇ Finding slope given the graph of a line on a grid
 - ◇ Finding slope given two points on the line
 - ◇ Finding the slope of a line given its equation
 - ◇ Writing an equation of a line given the y-intercept and another point
 - ◇ Writing the equation of a line given the slope and a point on the line
 - ◇ Writing the equation of the line through two given points
 - ◇ Writing an equation and drawing its graph to model a real-world situation: Advanced
 - ◇ Application problem with a linear function: Finding a coordinate given the slope and a point
 - ◇ Application problem with a linear function: Finding a coordinate given two points
 - ◇ Finding slopes of lines parallel and perpendicular to a line given in the form $Ax + By = C$
 - ◇ Writing equations of lines parallel and perpendicular to a given line through a point
 - ◇ Scatter plots and correlation
 - ◇ Sketching the line of best fit
 - ◆ Graphing Linear Inequalities (3 topics)
 - ◇ Graphing a linear inequality in the plane: Standard form
 - ◇ Graphing a linear inequality in the plane: Vertical or horizontal line
 - ◇ Graphing a linear inequality in the plane: Slope-intercept form
 - ◆ Sets, Relations, and Functions (8 topics)
 - ◇ Set builder and interval notation
 - ◇ Table for a linear function
 - ◇ Evaluating functions: Linear and quadratic or cubic
 - ◇ Evaluating a piecewise-defined function
 - ◇ Variable expressions as inputs of functions: Problem type 1
 - ◇ Domain and range from ordered pairs
 - ◇ Identifying functions from relations
 - ◇ Vertical line test
 - ◆ Graphs and Transformations of Functions (13 topics)
 - ◇ Finding intercepts of a nonlinear function given its graph
 - ◇ Finding local maxima and minima of a function given the graph
 - ◇ Domain and range from the graph of a continuous function
 - ◇ Writing an equation for a function after a vertical translation
 - ◇ Writing an equation for a function after a vertical and horizontal translation
 - ◇ Translating the graph of a function: One step
 - ◇ Translating the graph of a function: Two steps
 - ◇ Transforming the graph of a function by reflecting over an axis

- ◇ Transforming the graph of a function by shrinking or stretching
- ◇ Graphing a parabola of the form $y = ax^2$
- ◇ Graphing a cubic function of the form $y = ax^3$
- ◇ Graphing an absolute value equation in the plane: Advanced
- ◇ Graphing a piecewise–defined function: Problem type 1
- Systems of Linear Equations and Matrices (26 topics)
 - ◆ Solving Systems of Linear Equations (6 topics)
 - ◇ Classifying systems of linear equations from graphs
 - ◇ Graphically solving a system of linear equations
 - ◇ Solving a system of linear equations using substitution
 - ◇ Solving a system of linear equations using elimination with multiplication and addition
 - ◇ Solving a 2x2 system of linear equations that is inconsistent or consistent dependent
 - ◇ Solving a 3x3 system of linear equations: Problem type 1
 - ◆ Applications (6 topics)
 - ◇ Interpreting the graphs of two functions
 - ◇ Solving a word problem involving a sum and another basic relationship using a system of linear equations
 - ◇ Solving a value mixture problem using a system of linear equations
 - ◇ Solving a distance, rate, time problem using a system of linear equations
 - ◇ Solving a percent mixture problem using a system of linear equations
 - ◇ Solving a word problem using a 3x3 system of linear equations: Problem type 1
 - ◆ Solving Systems of Linear Inequalities (4 topics)
 - ◇ Graphing a system of two linear inequalities: Basic
 - ◇ Solving a word problem using a system of linear inequalities: Problem type 1
 - ◇ Linear programming
 - ◇ Solving a word problem using linear programming
 - ◆ Matrices (10 topics)
 - ◇ Scalar multiplication of a matrix
 - ◇ Addition or subtraction of matrices
 - ◇ Linear combination of matrices
 - ◇ Multiplication of matrices: Basic
 - ◇ Finding the determinant of a 2x2 matrix
 - ◇ Finding the determinant of a 3x3 matrix
 - ◇ Finding the inverse of a 2x2 matrix
 - ◇ Using Cramer's rule to solve a 2x2 system of linear equations
 - ◇ Using Cramer's rule to solve a 3x3 system of linear equations
 - ◇ Using the inverse of a matrix to solve a 3x3 system of linear equations
- Exponents and Polynomial Expressions (31 topics)
 - ◆ Properties of Exponents (11 topics)
 - ◇ Rewriting an algebraic expression without a negative exponent
 - ◇ Introduction to the product rule of exponents
 - ◇ Product rule with positive exponents: Multivariate
 - ◇ Product rule with negative exponents
 - ◇ Quotient of expressions involving exponents
 - ◇ Quotient rule with negative exponents: Problem type 1
 - ◇ Introduction to the power rules of exponents
 - ◇ Power rules with positive exponents
 - ◇ Power of a power rule with negative exponents
 - ◇ Power rules with negative exponents
 - ◇ Power and product rules with positive exponents
 - ◆ Polynomial Expressions (8 topics)
 - ◇ Degree and leading coefficient of a univariate polynomial
 - ◇ Simplifying a sum or difference of two univariate polynomials

- ◇ Multiplying a univariate polynomial by a monomial with a positive coefficient
- ◇ Multiplying binomials with leading coefficients of 1
- ◇ Multiplying conjugate binomials: Univariate
- ◇ Multiplying binomials in two variables
- ◇ Squaring a binomial: Univariate
- ◇ Multiplication involving binomials and trinomials in two variables
- ◆ Factoring (12 topics)
 - ◇ Introduction to the GCF of two monomials
 - ◇ Factoring out a monomial from a polynomial: Univariate
 - ◇ Factoring a quadratic with leading coefficient 1
 - ◇ Factoring a perfect square trinomial
 - ◇ Factoring a quadratic with leading coefficient greater than 1
 - ◇ Factoring a quadratic in two variables with leading coefficient greater than 1
 - ◇ Factoring a product of a quadratic trinomial and a monomial
 - ◇ Factoring a difference of squares
 - ◇ Factoring with repeated use of the difference of squares formula
 - ◇ Factoring a sum or difference of two cubes
 - ◇ Factoring a polynomial by grouping: Problem type 1
 - ◇ Factoring a polynomial by grouping: Problem type 2
- Quadratic and Polynomial Functions (56 topics)
 - ◆ Quadratic Equations (14 topics)
 - ◇ Finding the roots of a quadratic equation with leading coefficient 1
 - ◇ Finding the roots of a quadratic equation with leading coefficient greater than 1
 - ◇ Solving a quadratic equation needing simplification
 - ◇ Solving an equation that can be written in quadratic form: Problem type 1
 - ◇ Writing a quadratic equation given the roots and the leading coefficient
 - ◇ Solving a quadratic equation using the square root property: Exact answers, basic
 - ◇ Solving a quadratic equation using the square root property: Exact answers, advanced
 - ◇ Completing the square
 - ◇ Solving a quadratic equation by completing the square: Exact answers
 - ◇ Applying the quadratic formula: Exact answers
 - ◇ Discriminant of a quadratic equation
 - ◇ Discriminant of a quadratic equation with parameter
 - ◇ Solving a word problem using a quadratic equation with rational roots
 - ◇ Solving a word problem using a quadratic equation with irrational roots
 - ◆ Quadratic Functions (8 topics)
 - ◇ Finding the x–intercept(s) and the vertex of a parabola
 - ◇ Rewriting a quadratic function to find the vertex of its graph
 - ◇ Using a graphing calculator to find the x–intercept(s) and vertex of a quadratic function
 - ◇ Finding the maximum or minimum of a quadratic function
 - ◇ Word problem involving the maximum or minimum of a quadratic function
 - ◇ Graphing a parabola of the form $y = (x-h)^2 + k$
 - ◇ Graphing a parabola of the form $y = ax^2 + bx + c$: Integer coefficients
 - ◇ How the leading coefficient affects the shape of a parabola
 - ◆ Quadratic Inequalities (3 topics)
 - ◇ Solving a quadratic inequality written in factored form
 - ◇ Solving a quadratic inequality
 - ◇ Graphing a quadratic inequality: Problem type 1
 - ◆ Polynomial Division; Remainder and Factor Theorems (7 topics)
 - ◇ Dividing a polynomial by a monomial: Univariate
 - ◇ Polynomial long division: Problem type 1
 - ◇ Polynomial long division: Problem type 2
 - ◇ Polynomial long division: Problem type 3

- ◇ Synthetic division
- ◇ Using the remainder theorem to evaluate a polynomial
- ◇ The Factor Theorem
- ◆ Real Zeros of Polynomial Functions (8 topics)
 - ◇ Solving an equation written in factored form
 - ◇ Roots of a product of polynomials
 - ◇ Finding zeros of a polynomial function written in factored form
 - ◇ Finding a polynomial of a given degree with given zeros: Real zeros
 - ◇ Finding all possible rational zeros using the rational zeros theorem: Problem type 1
 - ◇ Finding all possible rational zeros using the rational zeros theorem: Problem type 2
 - ◇ Using the rational zeros theorem to find all zeros of a polynomial: Rational zeros
 - ◇ Using the rational zeros theorem to find all zeros of a polynomial: Irrational zeros
- ◆ Complex Numbers and Complex Zeros of Polynomial Functions (10 topics)
 - ◇ Using i to rewrite square roots of negative numbers
 - ◇ Simplifying a product and quotient involving square roots of negative numbers
 - ◇ Adding or subtracting complex numbers
 - ◇ Multiplying complex numbers
 - ◇ Dividing complex numbers
 - ◇ Simplifying a power of i
 - ◇ Solving a quadratic equation with complex roots
 - ◇ Multiplying expressions involving complex conjugates
 - ◇ Finding a polynomial of a given degree with given zeros: Complex zeros
 - ◇ Using the rational zeros theorem to find all zeros of a polynomial: Complex zeros
- ◆ Graphs of Polynomial Functions (6 topics)
 - ◇ Determining the end behavior of the graph of a polynomial function
 - ◇ Inferring properties of a polynomial function from its graph
 - ◇ Matching graphs with polynomial functions
 - ◇ Using a graphing calculator to find zeros of a polynomial function
 - ◇ Using a graphing calculator to find local extrema of a polynomial function
 - ◇ Using a graphing calculator to solve a word problem involving a polynomial of degree 3
- Radicals and Advanced Functions (36 topics)
 - ◆ Radical Functions (2 topics)
 - ◇ Domain of a square root function
 - ◇ Graphing a square root function
 - ◆ Simplifying Expressions (17 topics)
 - ◇ Square root of a perfect square
 - ◇ Square root of a rational perfect square
 - ◇ Cube root of an integer
 - ◇ Simplifying the square root of a whole number less than 100
 - ◇ Square root of a perfect square monomial
 - ◇ Simplifying a radical expression with an even exponent
 - ◇ Simplifying a radical expression with two variables
 - ◇ Simplifying a higher root of a whole number
 - ◇ Simplifying a higher radical expression: Multivariate
 - ◇ Square root addition or subtraction
 - ◇ Simplifying a sum or difference of radical expressions: Multivariate
 - ◇ Square root multiplication: Advanced
 - ◇ Simplifying a product of radical expressions: Multivariate
 - ◇ Simplifying a product involving square roots using the distributive property: Advanced
 - ◇ Rationalizing the denominator of a radical expression
 - ◇ Rationalizing the denominator of a radical expression using conjugates
 - ◇ Rationalizing a denominator: Quotient involving higher radicals and monomials
 - ◆ Rational Exponents (5 topics)

- ◇ Converting between radical form and exponent form
- ◇ Rational exponents: Non–unit fraction exponent with a whole number base
- ◇ Rational exponents: Negative exponents and fractional bases
- ◇ Rational exponents: Products and quotients with negative exponents
- ◇ Rational exponents: Powers of powers with negative exponents
- ◆ Radical Equations and Functions (6 topics)
 - ◇ Solving a radical equation that simplifies to a linear equation: One radical, basic
 - ◇ Solving a radical equation that simplifies to a linear equation: Two radicals
 - ◇ Solving a radical equation that simplifies to a quadratic equation: One radical
 - ◇ Solving a radical equation that simplifies to a quadratic equation: Two radicals
 - ◇ Solving an equation with a root index greater than 2
 - ◇ Solving an equation with positive rational exponent
- ◆ Combining Functions; Composite Functions; Inverse Functions (6 topics)
 - ◇ Sum, difference, and product of two functions
 - ◇ Quotient of two functions: Basic
 - ◇ Composition of two functions: Basic
 - ◇ Horizontal line test
 - ◇ Determining whether two functions are inverses of each other
 - ◇ Inverse functions: Linear, discrete
- Exponential and Logarithmic Functions (27 topics)
 - ◆ Properties of Logarithms (8 topics)
 - ◇ Evaluating an exponential function that models a real–world situation
 - ◇ Converting between logarithmic and exponential equations
 - ◇ Converting between natural logarithmic and exponential equations
 - ◇ Evaluating a logarithmic expression
 - ◇ Basic properties of logarithms
 - ◇ Writing an expression as a single logarithm
 - ◇ Expanding a logarithmic expression: Problem type 1
 - ◇ Change of base for logarithms: Problem type 1
 - ◆ Exponential and Logarithmic Equations (9 topics)
 - ◇ Solving an equation of the form $\log_b a = c$
 - ◇ Solving an equation involving logarithms on both sides: Problem type 1
 - ◇ Solving a multi–step equation involving a single logarithm
 - ◇ Solving a multi–step equation involving natural logarithms
 - ◇ Solving an equation involving logarithms on both sides: Problem type 2
 - ◇ Solving an exponential equation by using logarithms: Exact answers in logarithmic form
 - ◇ Solving an exponential equation by finding common bases: Linear and quadratic exponents
 - ◇ Solving exponential equations by using logarithms and natural logarithms: Decimal answers
 - ◇ Using a graphing calculator to solve an exponential or logarithmic equation
 - ◆ Applications (5 topics)
 - ◇ Finding a final amount in a word problem on exponential growth or decay
 - ◇ Finding the time to reach a limit in a word problem on exponential growth or decay
 - ◇ Finding the initial or final amount in a word problem on exponential growth or decay
 - ◇ Finding the rate or time in a word problem on continuous exponential growth or decay
 - ◇ Finding the final amount in a word problem on compound interest
 - ◆ Graphing Exponential and Logarithmic Functions (5 topics)
 - ◇ Graphing an exponential function and its asymptote: $f(x) = a(b)^x$
 - ◇ The graph, domain, and range of an exponential function
 - ◇ Graphing a logarithmic function: Basic
 - ◇ The graph, domain, and range of a logarithmic function
 - ◇ Translating the graph of a logarithmic or exponential function
- Rational Expressions and Functions (39 topics)
 - ◆ Simplifying Expressions (18 topics)

- ◇ Restriction on a variable in a denominator: Linear
- ◇ Domain of a rational function: Excluded values
- ◇ Simplifying a ratio of polynomials: Problem type 1
- ◇ Simplifying a ratio of polynomials: Problem type 2
- ◇ Multiplying rational expressions involving multivariate monomials
- ◇ Multiplying rational expressions involving quadratics with leading coefficients of 1
- ◇ Dividing rational expressions involving multivariate monomials
- ◇ Dividing rational expressions involving quadratics with leading coefficients of 1
- ◇ Introduction to the LCM of two monomials
- ◇ Adding rational expressions with common denominators and binomial numerators
- ◇ Adding rational expressions with different denominators: ax , bx
- ◇ Adding rational expressions with different denominators: $x+a$, $x+b$
- ◇ Adding rational expressions involving different quadratic denominators
- ◇ Complex fraction without variables: Problem type 1
- ◇ Complex fraction without variables: Problem type 2
- ◇ Complex fraction involving multivariate monomials
- ◇ Complex fraction: GCF and quadratic factoring
- ◇ Complex fraction made of sums involving rational expressions
- ◆ Rational Equations and Inequalities (9 topics)
 - ◇ Solving a proportion of the form $a/(x+b) = c/x$
 - ◇ Solving a rational equation that simplifies to linear: Denominator x
 - ◇ Solving a rational equation that simplifies to linear: Denominator $x+a$
 - ◇ Solving a rational equation that simplifies to linear: Unlike binomial denominators
 - ◇ Solving a rational equation that simplifies to linear: Denominators a , x , or ax
 - ◇ Solving a rational equation that simplifies to quadratic: Binomial denominators, constant numerators
 - ◇ Solving a rational equation that simplifies to quadratic: Binomial denominators and numerators
 - ◇ Solving a rational equation that simplifies to quadratic: Proportional form, advanced
 - ◇ Solving a rational inequality: Problem type 1
- ◆ Graphing Rational Functions (5 topics)
 - ◇ Finding the asymptotes of a rational function: Basic
 - ◇ Finding horizontal and vertical asymptotes of a rational function: Quadratic numerator or denominator
 - ◇ Graphing a rational function: Constant or linear over linear
 - ◇ Graphing rational functions with holes
 - ◇ Matching graphs with rational functions: Two vertical asymptotes
- ◆ Applications (7 topics)
 - ◇ Word problem on proportions: Problem type 1
 - ◇ Word problem involving multiple rates
 - ◇ Solving a work problem using a rational equation
 - ◇ Writing an equation that models variation
 - ◇ Word problem on direct variation
 - ◇ Word problem on inverse variation
 - ◇ Word problem on combined variation
- Conic Sections (16 topics)
 - ◆ Midpoint and Distance (2 topics)
 - ◇ Midpoint of a line segment in the plane
 - ◇ Distance between two points in the plane: Exact answers
 - ◆ Parabolas (1 topics)
 - ◇ Graphing a parabola of the form $ay^2 + by + cx + d = 0$ or $ax^2 + bx + cy + d = 0$
 - ◆ Circles (4 topics)
 - ◇ Graphing a circle given its equation in standard form
 - ◇ Graphing a circle given its equation in general form
 - ◇ Writing an equation of a circle given its center and a point on the circle

- ◊ Writing an equation of a circle given the endpoints of a diameter
- ◆ Ellipses (3 topics)
 - ◊ Graphing an ellipse centered at the origin: $Ax^2 + By^2 = C$
 - ◊ Graphing an ellipse given its equation in standard form
 - ◊ Graphing an ellipse given its equation in general form
- ◆ Hyperbolas (3 topics)
 - ◊ Graphing a hyperbola centered at the origin: $Ax^2 + By^2 = C$
 - ◊ Graphing a hyperbola given its equation in standard form
 - ◊ Graphing a hyperbola given its equation in general form
- ◆ Classifying Conics and Systems of Nonlinear Equations (3 topics)
 - ◊ Classifying conics given their equations
 - ◊ Solving a system of nonlinear equations: Problem type 1
 - ◊ Graphing a system of nonlinear inequalities: Problem type 1
- Sequences and Probability (23 topics)
 - ◆ Sequences and Series (7 topics)
 - ◊ Finding the first terms of a sequence using an explicit rule with multiple occurrences of n
 - ◊ Arithmetic and geometric sequences: Identifying and writing an explicit rule
 - ◊ Finding a specified term of an arithmetic sequence given two terms of the sequence
 - ◊ Finding a specified term of a geometric sequence given two terms of the sequence
 - ◊ Sum of the first n terms of an arithmetic sequence
 - ◊ Sum of the first n terms of a geometric sequence
 - ◊ Sum of an infinite geometric series
 - ◆ Permutations and Combinations (6 topics)
 - ◊ Counting principle
 - ◊ Factorial expressions
 - ◊ Introduction to permutations and combinations
 - ◊ Permutations and combinations: Problem type 1
 - ◊ Permutations and combinations: Problem type 2
 - ◊ Binomial formula
 - ◆ Probability (8 topics)
 - ◊ Probability of an event
 - ◊ Outcomes and event probability
 - ◊ Probabilities involving two dice
 - ◊ Experimental and theoretical probability
 - ◊ Area as probability
 - ◊ Probability of independent events
 - ◊ Probability of dependent events
 - ◊ Probabilities of draws with replacement
 - ◆ Statistics (2 topics)
 - ◊ Finding the mode and range of a data set
 - ◊ Mean and median of a data set
- Other Topics Available(*) (202 additional topics)
 - ◆ Real Numbers and Linear Equations (38 topics)
 - ◊ Fractional position on a number line
 - ◊ Plotting rational numbers on a number line
 - ◊ Operations with absolute value: Problem type 2
 - ◊ Ordering numbers with positive exponents
 - ◊ Ordering numbers with negative exponents
 - ◊ Ordering fractions with variables
 - ◊ Solving an equation to find the value of an expression
 - ◊ Solving a decimal word problem using a linear equation with the variable on both sides

- ◇ Solving a fraction word problem using a linear equation with the variable on both sides
- ◇ Solving a word problem with three unknowns using a linear equation
- ◇ Solving a percent mixture problem using a linear equation
- ◇ Word problem on unit rates associated with ratios of whole numbers: Decimal answers
- ◇ Finding the original price given the sale price and percent discount
- ◇ Finding the percentage increase or decrease: Advanced
- ◇ Computations from a circle graph
- ◇ Computing a percentage from a table of values
- ◇ Finding the value for a new score that will yield a given mean
- ◇ Translating a sentence by using an inequality symbol
- ◇ Translating a sentence into a compound inequality
- ◇ Solving a compound linear inequality: Interval notation
- ◇ Solving a decimal word problem using a linear inequality with the variable on both sides
- ◇ Solving an absolute value equation of the form $|ax+b| = |cx+d|$
- ◇ Sides of polygons having the same perimeter
- ◇ Finding a side length given the perimeter and side lengths with variables
- ◇ Finding the perimeter or area of a rectangle given one of these values
- ◇ Area of a triangle
- ◇ Circumference ratios
- ◇ Word problem involving the area between two concentric circles
- ◇ Volume of a rectangular prism
- ◇ Volume of a cylinder
- ◇ Word problem involving the rate of filling or emptying a cylinder
- ◇ Ratio of volumes
- ◇ Surface area of a cube or a rectangular prism
- ◇ Surface area of a cylinder: Exact answers in terms of pi
- ◇ Solving equations involving vertical angles and linear pairs
- ◇ Finding angle measures of a right or isosceles triangle given angles with variables
- ◇ Similar polygons
- ◇ Indirect measurement
- ◆ Lines and Functions (10 topics)
 - ◇ Writing the equations of vertical and horizontal lines through a given point
 - ◇ Set builder notation
 - ◇ Union and intersection of finite sets
 - ◇ Union and intersection of intervals
 - ◇ Determining whether an equation defines a function: Advanced
 - ◇ Finding inputs and outputs of a function from its graph
 - ◇ Finding where a function is increasing, decreasing, or constant given the graph: Interval notation
 - ◇ Domain and range from the graph of a piecewise function
 - ◇ Transforming the graph of a function using more than one transformation
 - ◇ Choosing a graph to fit a narrative: Advanced
- ◆ Systems of Linear Equations and Matrices (5 topics)
 - ◇ Creating an inconsistent system of linear equations
 - ◇ Solving a tax rate or interest rate problem using a system of linear equations
 - ◇ Multiplication of matrices: Advanced
 - ◇ Gauss–Jordan elimination with a 2x2 matrix
 - ◇ Solving a system of linear equations given its augmented matrix
- ◆ Exponents and Polynomial Expressions (8 topics)
 - ◇ Understanding the product rule of exponents
 - ◇ Understanding the power rules of exponents
 - ◇ Power, product, and quotient rules with negative exponents
 - ◇ Degree of a multivariate polynomial
 - ◇ Simplifying a sum or difference of three univariate polynomials

- ◇ Multiplying a multivariate polynomial by a monomial
- ◇ Greatest common factor of two multivariate monomials
- ◇ Factoring out a monomial from a polynomial: Multivariate
- ◆ Quadratic and Polynomial Functions (10 topics)
 - ◇ Range of a quadratic function
 - ◇ Graphing a parabola of the form $y = ax^2 + bx + c$: Rational coefficients
 - ◇ Classifying the graph of a function
 - ◇ Writing the equation of a quadratic function given its graph
 - ◇ Graphing a quadratic inequality: Problem type 2
 - ◇ Dividing a polynomial by a monomial: Multivariate
 - ◇ Descartes' Rule of Signs
 - ◇ Linear factors theorem and conjugate zeros theorem
 - ◇ Finding x- and y-intercepts given a polynomial function
 - ◇ Using a graphing calculator to solve a word problem involving a local extremum of a polynomial function
- ◆ Radicals and Advanced Functions (10 topics)
 - ◇ Simplifying a product of radical expressions: Multivariate, fractional expressions
 - ◇ Special products of radical expressions: Conjugates and squaring
 - ◇ Simplifying products or quotients of higher radicals with different indices: Multivariate
 - ◇ Solving an equation using the odd-root property: Problem type 1
 - ◇ Solving an equation using the odd-root property: Problem type 2
 - ◇ Solving an equation with negative rational exponent
 - ◇ Composition of two functions: Domain and range
 - ◇ Composition of two functions: Advanced
 - ◇ Inverse functions: Rational
 - ◇ Inverse functions: Quadratic, cubic, radical
- ◆ Exponential and Logarithmic Functions (4 topics)
 - ◇ Expanding a logarithmic expression: Problem type 2
 - ◇ Change of base for logarithms: Problem type 2
 - ◇ Graphing an exponential function and its asymptote: $f(x) = a(e)^{x-b} + c$
 - ◇ Graphing a logarithmic function: Advanced
- ◆ Rational Expressions and Functions (8 topics)
 - ◇ Simplifying a ratio of multivariate polynomials
 - ◇ Least common multiple of two monomials
 - ◇ Adding rational expressions with multivariate monomial denominators: Advanced
 - ◇ Complex fraction that contains a complex fraction
 - ◇ Solving a rational inequality: Problem type 2
 - ◇ Graphing a rational function: Quadratic over linear
 - ◇ Word problem on proportions: Problem type 2
 - ◇ Word problem on inverse proportions
- ◆ Conic Sections (8 topics)
 - ◇ Writing an equation of a parabola given the vertex and the focus
 - ◇ Finding the focus of a parabola of the form $ay^2 + by + cx + d = 0$ or $ax^2 + bx + cy + d = 0$
 - ◇ Finding the foci of an ellipse given its equation in general form
 - ◇ Writing an equation of an ellipse given the center, an endpoint of an axis, and the length of the other axis
 - ◇ Finding the foci of a hyperbola given its equation in general form
 - ◇ Writing an equation of a hyperbola given the foci and the vertices
 - ◇ Using a graphing calculator to solve a system of equations
 - ◇ Graphing a system of nonlinear inequalities: Problem type 2
- ◆ Sequences and Probability (14 topics)
 - ◇ Permutations and combinations: Problem type 3
 - ◇ Probabilities of draws without replacement

- ◇ Probability of intersection or union: Word problems
- ◇ Independent events: Basic
- ◇ Probability of union: Basic
- ◇ Conditional probability: Basic
- ◇ Binomial problems: Basic
- ◇ Binomial problems: Advanced
- ◇ Mode of a data set
- ◇ Weighted mean
- ◇ Constructing a box-and-whisker plot
- ◇ Percentiles
- ◇ Population standard deviation
- ◇ Word problem involving calculations from a normal distribution
- ◆ Trigonometry (87 topics)
 - ◇ Special right triangles: Exact answers
 - ◇ Sine, cosine, and tangent ratios: Variables for side lengths
 - ◇ Finding trigonometric ratios given a right triangle
 - ◇ Using a trigonometric ratio to find a side length in a right triangle
 - ◇ Using trigonometry to find a length in a word problem with one right triangle
 - ◇ Using a trigonometric ratio to find an angle measure in a right triangle
 - ◇ Using trigonometry to find angles of elevation or depression in a word problem
 - ◇ Solving a right triangle
 - ◇ Converting degrees–minutes–seconds to decimal degrees
 - ◇ Converting a decimal degree to degrees–minutes–seconds
 - ◇ Converting between degree and radian measure: Problem type 1
 - ◇ Converting between degree and radian measure: Problem type 2
 - ◇ Sketching an angle in standard position
 - ◇ Coterminal angles
 - ◇ Reference angles: Problem type 1
 - ◇ Reference angles: Problem type 2
 - ◇ Arc length and central angle measure
 - ◇ Area of a sector of a circle
 - ◇ Finding coordinates on the unit circle for special angles
 - ◇ Determining the location of a terminal point given the signs of trigonometric values
 - ◇ Trigonometric functions and special angles: Problem type 1
 - ◇ Trigonometric functions and special angles: Problem type 2
 - ◇ Trigonometric functions and special angles: Problem type 3
 - ◇ Finding values of trigonometric functions given information about an angle: Problem type 1
 - ◇ Finding values of trigonometric functions given information about an angle: Problem type 2
 - ◇ Finding values of trigonometric functions given information about an angle: Problem type 3
 - ◇ Solving a triangle with the law of sines: Problem type 1
 - ◇ Solving a triangle with the law of sines: Problem type 2
 - ◇ Solving a word problem using the law of sines
 - ◇ Solving a triangle with the law of cosines
 - ◇ Solving a word problem using the law of cosines
 - ◇ Finding the area of a triangle using trigonometry
 - ◇ Heron's formula
 - ◇ Amplitude and period of sine and cosine functions
 - ◇ Amplitude, period, and phase shift of sine and cosine functions
 - ◇ Word problem involving a sine or cosine function: Problem type 1
 - ◇ Writing the equation of a sine or cosine function given its graph: Problem type 1
 - ◇ Writing the equation of a sine or cosine function given its graph: Problem type 2
 - ◇ Sketching the graph of $y = a \sin(x+c)$ or $y = a \cos(x+c)$
 - ◇ Sketching the graph of $y = a \sin(bx)$ or $y = a \cos(bx)$

- ◇ Sketching the graph of $y = a \sin(bx+c)$ or $y = a \cos(bx+c)$
- ◇ Sketching the graph of a secant or cosecant function: Problem type 1
- ◇ Sketching the graph of a secant or cosecant function: Problem type 2
- ◇ Sketching the graph of a tangent or cotangent function: Problem type 1
- ◇ Sketching the graph of a tangent or cotangent function: Problem type 2
- ◇ Values of inverse trigonometric functions
- ◇ Simplifying trigonometric expressions
- ◇ Using cofunction identities
- ◇ Sum and difference identities: Problem type 1
- ◇ Sum and difference identities: Problem type 2
- ◇ Sum and difference identities: Problem type 3
- ◇ Double–angle identities: Problem type 1
- ◇ Double–angle identities: Problem type 2
- ◇ Half–angle identities: Problem type 1
- ◇ Half–angle identities: Problem type 2
- ◇ Verifying a trigonometric identity
- ◇ Proving trigonometric identities: Problem type 1
- ◇ Proving trigonometric identities: Problem type 2
- ◇ Proving trigonometric identities: Problem type 3
- ◇ Proving trigonometric identities using sum and difference properties
- ◇ Proving trigonometric identities using double–angle properties
- ◇ Finding solutions in an interval for a basic equation involving sine or cosine
- ◇ Solving a basic trigonometric equation using a calculator
- ◇ Finding solutions in an interval for a basic tangent, cotangent, secant, or cosecant equation
- ◇ Finding solutions in an interval for a trigonometric equation in factored form
- ◇ Finding solutions in an interval for a trigonometric equation with a squared function: Problem type 1
- ◇ Finding solutions in an interval for a trigonometric equation with a squared function: Problem type 2
- ◇ Finding solutions in an interval for a trigonometric equation using Pythagorean identities: Problem type 1
- ◇ Finding solutions in an interval for an equation with sine and cosine using double–angle identities
- ◇ Solving a trigonometric equation modeling a real–world situation
- ◇ Using a graphing calculator to solve a trigonometric equation
- ◇ Solving a basic trigonometric equation involving sine or cosine
- ◇ Solving a basic trigonometric equation involving tangent, cotangent, secant, or cosecant
- ◇ Solving a trigonometric equation involving a squared function: Problem type 1
- ◇ Solving a trigonometric equation involving a squared function: Problem type 2
- ◇ Solving a trigonometric equation involving more than one function
- ◇ Solving a trigonometric equation using double–angle identities
- ◇ Magnitude of a vector given in component form
- ◇ Translation of a vector
- ◇ Multiplication of a vector by a scalar: Geometric approach
- ◇ Vector addition: Geometric approach
- ◇ Vector subtraction: Geometric approach
- ◇ Vector addition and scalar multiplication: Component form
- ◇ Linear combination of vectors: Component form
- ◇ Dot product of vectors given in component form
- ◇ Using the dot product to find perpendicular vectors
- ◇ Finding the angle between two vectors given in component form

Other Topics Available *By default, these topics are NOT included in the course, but can be added using the content*

editor in the Teacher Module.