Prep for College Algebra

This course covers the topics outlined below. You can customize the scope and sequence of this course to meet your curricular needs.

Curriculum (219 topics + 85 additional topics)

- Real Numbers (29 topics)
  - Fractions (5 topics)
    ◊ Simplifying a fraction
    ◊ Using a common denominator to order fractions
    ◊ Addition or subtraction of fractions with different denominators
    ◊ Fraction multiplication
    ◊ Fraction division
- Percents and Proportions (7 topics)
  ◊ Converting between percentages and decimals
  ◊ Applying the percent equation
  ◊ Finding the sale price without a calculator given the original price and percent discount
  ◊ Finding the original price given the sale price and percent discount
  ◊ Finding simple interest without a calculator
  ◊ Solving a proportion of the form \( x/a = b/c \)
  ◊ Word problem on proportions: Problem type 1
- Signed Numbers (15 topics)
  ◊ Integer addition: Problem type 2
  ◊ Integer subtraction: Problem type 3
  ◊ 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: Basic
  ◊ Signed fraction multiplication: Advanced
  ◊ Exponents and integers: Problem type 1
  ◊ 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
  ◊ Operations with absolute value: Problem type 2
- Properties of Real Numbers (2 topics)
  ◊ Identifying numbers as integers or non-integers
  ◊ Identifying numbers as rational or irrational
- Equations and Inequalities (31 topics)
  - Linear Equations (20 topics)
    ◊ Additive 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 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
• Algebraic symbol manipulation: Problem type 1
• Algebraic symbol manipulation: Problem type 2
• Writing a one-step expression for a real-world situation
• Translating a phrase into a two-step expression
• Translating a sentence into a one-step equation
• 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 percent mixture problem using a linear equation
• Solving a distance, rate, time problem using a linear equation

♦ Linear Inequalities (8 topics)
• Graphing a linear inequality 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 compound linear inequality: Graph solution, basic
• Solving a decimal word problem using a two-step linear inequality

♦ Absolute Value Equations and Inequalities (3 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

♦ Exponents and Polynomials (41 topics)
• Properties of Exponents (13 topics)
• Evaluating an expression with a negative exponent: Positive fraction base
• Evaluating an expression with a negative exponent: Negative integer base
• 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

♦ Scientific Notation (2 topics)
• Scientific notation with positive exponent
• Scientific notation with negative exponent

♦ Polynomial Expressions (9 topics)
◊ Degree and leading coefficient of a univariate polynomial
◊ Combining like terms: Advanced
◊ Simplifying a sum or difference of two univariate polynomials
◊ Multiplying a univariate polynomial by a monomial with a positive coefficient
◊ Multiplying a multivariate polynomial by a monomial
◊ Multiplying binomials with leading coefficients of 1
◊ Multiplying conjugate binomials: Univariate
◊ Squaring a binomial: Univariate
◊ Multiplication involving binomials and trinomials in two variables

♦ Factoring (9 topics)
◊ Introduction to the GCF of two monomials
◊ Greatest common factor of two multivariate monomials
◊ Factoring out a monomial from a polynomial: Univariate
◊ Factoring out a monomial from a polynomial: Multivariate
◊ Factoring a quadratic with leading coefficient 1
◊ Factoring a quadratic with leading coefficient greater than 1
◊ Factoring a product of a quadratic trinomial and a monomial
◊ Factoring a difference of squares
◊ Factoring a polynomial by grouping: Problem type 1

♦ Quadratic Equations (8 topics)
◊ Solving an equation written in factored form
◊ 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 a quadratic equation using the square root property: Exact answers, basic
◊ Completing the square
◊ Applying the quadratic formula: Exact answers
◊ Solving a word problem using a quadratic equation with rational roots

♦ Lines and Systems (28 topics)

♦ Ordered Pairs (3 topics)
◊ 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 (12 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
◊ Finding slopes of lines parallel and perpendicular to a line given in the form Ax + By = C
◊ 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

♦ Graphing Linear Inequalities (2 topics)
Graphing a linear inequality in the plane: Vertical or horizontal line
Graphing a linear inequality in the plane: Slope–intercept form

Systems of Linear Equations (6 topics)
- 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 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
- Interpreting the graphs of two functions

Functions and Graphs (17 topics)
- Sets, Relations, and Functions (8 topics)
  - Union and intersection of finite sets
  - Set builder and interval notation
  - Identifying functions from relations
  - Vertical line test
  - Evaluating functions: Linear and quadratic or cubic
  - Evaluating functions: Absolute value, rational, radical
  - Variable expressions as inputs of functions: Problem type 1
  - Domain and range from ordered pairs
- Graphs and Transformations (9 topics)
  - Finding intercepts of a nonlinear function given its graph
  - Domain and range from the graph of a continuous function
  - Writing an equation for a function after a vertical translation
  - Translating the graph of a function: One step
  - Finding the x–intercept(s) and the vertex of a parabola
  - Graphing a parabola of the form \( y = ax^2 \)
  - Graphing a parabola of the form \( y = (x-h)^2 + k \)
  - Graphing a cubic function of the form \( y = ax^3 \)
  - Graphing an absolute value equation in the plane: Advanced

Rational Expressions (26 topics)
- Rational Expressions (18 topics)
  - Domain of a rational function: Excluded values
  - Simplifying a ratio of polynomials: Problem type 1
  - Simplifying a ratio of polynomials: Problem type 2
  - Simplifying a ratio of multivariate polynomials
  - Multiplying rational expressions involving multivariate monomials
  - Multiplying rational expressions involving quadratics with leading coefficients of 1
  - Dividing rational expressions involving multivariate monomials
  - 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
  - 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
  - Dividing a polynomial by a monomial: Univariate
  - Polynomial long division: Problem type 1
  - Polynomial long division: Problem type 2
- Rational Equations (6 topics)
  - 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

Variation (2 topics)
- Word problem on direct variation
- Word problem on inverse variation

Radical Expressions (25 topics)
- Radical Functions (2 topics)
  - Domain of a square root function: Advanced
  - Graphing a square root function
- Radical Expressions (15 topics)
  - 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
- 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 (3 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

Geometry (22 topics)
- Perimeter, Area, and Volume (16 topics)
  - Perimeter of a square or a rectangle
  - Area of a square or a rectangle
  - Area of a piecewise rectangular figure
  - Finding a side length given the perimeter and side lengths with variables
  - Finding the side length of a rectangle given its perimeter or area
  - Finding the perimeter or area of a rectangle given one of these values
  - Area of a parallelogram
  - Area of a triangle
  - Circumference and area of a circle
  - Perimeter involving rectangles and circles
  - Area involving inscribed figures
  - Volume of a rectangular prism
  - Volume of a cylinder
  - Surface area of a cube or a rectangular prism
Surface area of a cylinder: Exact answers in terms of pi

Similar polygons

Angles (3 topics)
- Solving equations involving vertical angles
- Finding an angle measure of a triangle given two angles
- Finding an angle measure for a triangle with an extended side

Coordinate Geometry (3 topics)
- Pythagorean Theorem
- Distance between two points in the plane: Exact answers
- Graphing a circle given its equation in standard form

- Other Topics Available(*) (85 additional topics)
  Real Numbers (7 topics)
  - Fractional part of a circle
  - Finding the percentage increase or decrease: Advanced
  - Word problem on unit rates associated with ratios of whole numbers: Decimal answers
  - Word problem on proportions: Problem type 2
  - Exponents and integers: Problem type 2
  - Properties of addition
  - Properties of real numbers

  Equations and Inequalities (7 topics)
  - 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 compound linear inequality: Interval notation
  - Writing a multi-step inequality for a real-world situation
  - Solving a decimal word problem using a linear inequality with the variable on both sides

  Exponents and Polynomials (16 topics)
  - Evaluating expressions with exponents of zero
  - Ordering numbers with positive exponents
  - Ordering numbers with negative exponents
  - Power, product, and quotient rules with negative exponents
  - Multiplying and dividing numbers written in scientific notation
  - Degree of a multivariate polynomial
  - Simplifying a sum or difference of three univariate polynomials
  - Factoring with repeated use of the difference of squares formula
  - Factoring a sum or difference of two cubes
  - Solving an equation that can be written in quadratic form: Problem type 1
  - Solving a quadratic equation using the square root property: Exact answers, advanced
  - Solving a quadratic equation by completing the square: Exact answers
  - Discriminant of a quadratic equation
  - Solving a word problem using a quadratic equation with irrational roots
  - Solving a quadratic inequality written in factored form
  - Solving a quadratic inequality

  Lines and Systems (10 topics)
  - Writing the equations of vertical and horizontal lines through a given point
  - Writing equations of lines parallel and perpendicular to a given line through a point
  - Graphing a linear inequality in the plane: Standard form
  - Solving a 3x3 system of linear equations: Problem type 1
  - Solving a 2x2 system of linear equations that is inconsistent or consistent dependent
  - 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 tax rate or interest rate problem using a system of linear equations
◊ Solving a word problem using a 3x3 system of linear equations: Problem type 1
◊ Graphing a system of two linear inequalities: Basic

♦ Functions and Graphs (18 topics)
  ◇ Set builder notation
  ◇ Evaluating a piecewise-defined function
  ◇ Finding inputs and outputs of a function from its graph
  ◇ Finding where a function is increasing, decreasing, or constant given the graph: Interval notation
  ◇ Finding local maxima and minima of a function given the graph
  ◇ Finding zeros of a polynomial function written in factored form
  ◇ Writing an equation for a function after a vertical and horizontal translation
  ◇ 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 \( y = ax^2 + bx + c \): Integer coefficients
  ◇ Classifying the graph of a function
  ◇ 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

♦ Rational Expressions (7 topics)
  ◇ Ordering fractions with variables
  ◇ Dividing rational expressions involving quadratics with leading coefficients of 1
  ◇ Least common multiple of two monomials
  ◇ Adding rational expressions with multivariate monomial denominators: Advanced
  ◇ Complex fraction made of sums involving rational expressions
  ◇ Writing an equation that models variation
  ◇ Word problem on combined variation

♦ Radical Expressions (9 topics)
  ◇ Special products of radical expressions: Conjugates and squaring
  ◇ Rationalizing a denominator: Quotient involving higher radicals and monomials
  ◇ 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

♦ Geometry (11 topics)
  ◇ Areas of rectangles with the same perimeter
  ◇ Finding the radius or the diameter of a circle given its circumference
  ◇ Circumference ratios
  ◇ Area involving rectangles and circles
  ◇ Word problem involving the area between two concentric circles
  ◇ Word problem involving the rate of filling or emptying a cylinder
  ◇ Indirect measurement
  ◇ Midpoint of a line segment in the plane
  ◇ 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
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.