Prep for PreCalculus

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

Curriculum (show all) (246 topics + 58 additional topics)

- Real Numbers (30 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 (8 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
    ◊ Word problem on proportions: Problem type 2
  - 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 (32 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 (9 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 compound linear inequality: Interval notation
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 (44 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
<table>
<thead>
<tr>
<th>Topic</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific notation with negative exponent</td>
<td></td>
</tr>
<tr>
<td>Polynomial Expressions (9 topics)</td>
<td></td>
</tr>
<tr>
<td>Degree and leading coefficient of a univariate polynomial</td>
<td></td>
</tr>
<tr>
<td>Combining like terms: Advanced</td>
<td></td>
</tr>
<tr>
<td>Simplifying a sum or difference of two univariate polynomials</td>
<td></td>
</tr>
<tr>
<td>Multiplying a univariate polynomial by a monomial with a positive coefficient</td>
<td></td>
</tr>
<tr>
<td>Multiplying a multivariate polynomial by a monomial</td>
<td></td>
</tr>
<tr>
<td>Multiplying binomials with leading coefficients of 1</td>
<td></td>
</tr>
<tr>
<td>Multiplying conjugate binomials: Univariate</td>
<td></td>
</tr>
<tr>
<td>Squaring a binomial: Univariate</td>
<td></td>
</tr>
<tr>
<td>Multiplication involving binomials and trinomials in two variables</td>
<td></td>
</tr>
<tr>
<td>Factoring (9 topics)</td>
<td></td>
</tr>
<tr>
<td>Introduction to the GCF of two monomials</td>
<td></td>
</tr>
<tr>
<td>Greatest common factor of two multivariate monomials</td>
<td></td>
</tr>
<tr>
<td>Factoring out a monomial from a polynomial: Univariate</td>
<td></td>
</tr>
<tr>
<td>Factoring out a monomial from a polynomial: Multivariate</td>
<td></td>
</tr>
<tr>
<td>Factoring a quadratic with leading coefficient 1</td>
<td></td>
</tr>
<tr>
<td>Factoring a quadratic with leading coefficient greater than 1</td>
<td></td>
</tr>
<tr>
<td>Factoring a product of a quadratic trinomial and a monomial</td>
<td></td>
</tr>
<tr>
<td>Factoring a difference of squares</td>
<td></td>
</tr>
<tr>
<td>Factoring a polynomial by grouping: Problem type 1</td>
<td></td>
</tr>
<tr>
<td>Quadratic Equations (11 topics)</td>
<td></td>
</tr>
<tr>
<td>Solving an equation written in factored form</td>
<td></td>
</tr>
<tr>
<td>Finding the roots of a quadratic equation with leading coefficient 1</td>
<td></td>
</tr>
<tr>
<td>Finding the roots of a quadratic equation with leading coefficient greater than 1</td>
<td></td>
</tr>
<tr>
<td>Solving a quadratic equation needing simplification</td>
<td></td>
</tr>
<tr>
<td>Solving a quadratic equation using the square root property: Exact answers, basic</td>
<td></td>
</tr>
<tr>
<td>Completing the square</td>
<td></td>
</tr>
<tr>
<td>Applying the quadratic formula: Exact answers</td>
<td></td>
</tr>
<tr>
<td>Discriminant of a quadratic equation</td>
<td></td>
</tr>
<tr>
<td>Solving a word problem using a quadratic equation with rational roots</td>
<td></td>
</tr>
<tr>
<td>Solving a word problem using a quadratic equation with irrational roots</td>
<td></td>
</tr>
<tr>
<td>Solving a quadratic inequality written in factored form</td>
<td></td>
</tr>
<tr>
<td>Lines and Systems (33 topics)</td>
<td></td>
</tr>
<tr>
<td>Ordered Pairs (3 topics)</td>
<td></td>
</tr>
<tr>
<td>Plotting a point in the coordinate plane</td>
<td></td>
</tr>
<tr>
<td>Finding a solution to a linear equation in two variables</td>
<td></td>
</tr>
<tr>
<td>Determining whether given points lie on one, both, or neither of 2 lines given equations</td>
<td></td>
</tr>
<tr>
<td>Graphing Lines (5 topics)</td>
<td></td>
</tr>
<tr>
<td>Graphing a line given its x− and y−intercepts</td>
<td></td>
</tr>
<tr>
<td>Graphing a line given its equation in slope−intercept form</td>
<td></td>
</tr>
<tr>
<td>Graphing a line given its equation in standard form</td>
<td></td>
</tr>
<tr>
<td>Graphing a line through a given point with a given slope</td>
<td></td>
</tr>
<tr>
<td>Graphing a vertical or horizontal line</td>
<td></td>
</tr>
<tr>
<td>Equations of Lines (13 topics)</td>
<td></td>
</tr>
<tr>
<td>Finding the y−intercept of a line given its equation</td>
<td></td>
</tr>
<tr>
<td>Finding x− and y−intercepts of a line given the equation: Advanced</td>
<td></td>
</tr>
<tr>
<td>Finding slope given the graph of a line on a grid</td>
<td></td>
</tr>
<tr>
<td>Finding slope given two points on the line</td>
<td></td>
</tr>
<tr>
<td>Finding the slope of a line given its equation</td>
<td></td>
</tr>
<tr>
<td>Writing an equation of a line given the y−intercept and another point</td>
<td></td>
</tr>
<tr>
<td>Writing the equation of a line given the slope and a point on the line</td>
<td></td>
</tr>
<tr>
<td>Writing the equation of the line through two given points</td>
<td></td>
</tr>
</tbody>
</table>
◊ 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
◊ 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 (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

♦ Systems of Linear Equations (9 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
  ◊ Solving a distance, rate, time problem using a system of linear equations
  ◊ Solving a percent mixture problem using a system of linear equations
  ◊ Interpreting the graphs of two functions
  ◊ Graphing a system of two linear inequalities: Basic

• Functions and Graphs (29 topics)
  ♦ Sets, Relations, and Functions (9 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
    ◊ Evaluating a piecewise-defined function
    ◊ Variable expressions as inputs of functions: Problem type 1
    ◊ Domain and range from ordered pairs
  ♦ Graphs and Transformations (16 topics)
    ◊ Finding intercepts of a nonlinear function given its graph
    ◊ Finding local maxima and minima of a function given the graph
    ◊ Finding zeros of a polynomial function written in factored form
    ◊ 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
    ◊ 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 parabola of the form $y = ax^2 + bx + c$: Integer coefficients
    ◊ Graphing a cubic function of the form $y = ax^3$
    ◊ Graphing an absolute value equation in the plane: Advanced
  ♦ Combining Functions; Composite Functions; Inverse Functions (4 topics)
    ◊ Sum, difference, and product of two functions
    ◊ Quotient of two functions: Basic
    ◊ Composition of two functions: Basic
    ◊ Inverse functions: Linear, discrete
- Rational Expressions (27 topics)
  ◇ Rational Expressions (19 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
    ◆ Complex fraction made of sums involving rational expressions
    ◆ 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 (26 topics)
  ◇ Radical Functions (2 topics)
    ◆ Domain of a square root function: Advanced
    ◆ Graphing a square root function
  ◇ Radical Expressions (16 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
    ◆ Special products of radical expressions: Conjugates and squaring
    ◆ 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 (25 topics)
◊ Perimeter, Area, and Volume (17 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
  ◊ Indirect measurement

◊ 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 (5 topics)
  ◊ Pythagorean Theorem
  ◊ Distance between two points in the plane: Exact answers
  ◊ 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

• Other Topics Available(*) (58 additional topics)
  ♦ Real Numbers (6 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
    ◊ Exponents and integers: Problem type 2
    ◊ Properties of addition
    ◊ Properties of real numbers

  ♦ Equations and Inequalities (6 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
◊ 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 (13 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
◊ Solving a quadratic inequality

♦ Lines and Systems (5 topics)
◊ Writing the equations of vertical and horizontal lines through a given point
◊ 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 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

♦ Functions and Graphs (6 topics)
◊ Set−builder notation
◊ Finding inputs and outputs of a function from its graph
◊ Finding where a function is increasing, decreasing, or constant given the graph: Interval notation
◊ Classifying the graph of a function
◊ Horizontal line test
◊ Determining whether two functions are inverses of each other

♦ Rational Expressions (6 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
◊ Writing an equation that models variation
◊ Word problem on combined variation

♦ Radical Expressions (8 topics)
◊ 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 (8 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
◊ Midpoint of a line segment in the plane
◊ 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.