

## Prep for College Algebra

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

- Real Numbers
  - ◆ Fractions
    - ◇ Simplifying a fraction
    - ◇ Ordering fractions
    - ◇ Addition or subtraction of fractions with different denominators
    - ◇ Fraction multiplication
    - ◇ Fraction division
    - ◇ Fractional part of a circle
  - ◆ Proportion and Percent
    - ◇ Converting between percentages and decimals
    - ◇ Word problem on percentage: Problem type 1
    - ◇ Word problem on percentage: Problem type 2
    - ◇ Word problem on percentage: Problem type 3
    - ◇ Basic word problem on rates
    - ◇ Solving a proportion: Basic
    - ◇ Word problem on proportions: Problem type 1
  - ◆ Integers and Signed Numbers
    - ◇ Absolute value of a number
    - ◇ Operations with absolute value
    - ◇ Integer addition: Problem type 2
    - ◇ Integer subtraction
    - ◇ Integer multiplication and division
    - ◇ Signed fraction multiplication
    - ◇ Signed fraction addition
    - ◇ Signed decimal addition
    - ◇ Evaluating expressions with exponents: Problem type 1
    - ◇ Evaluating expressions with exponents: Problem type 2
    - ◇ Exponents and order of operations
  - ◆ Number Systems
    - ◇ Integers and rational numbers
    - ◇ Rational and irrational numbers
    - ◇ Properties of addition
    - ◇ Properties of real numbers
- Exponents and Polynomials
  - ◆ Integer Exponents
    - ◇ Product rule of exponents
    - ◇ Product rule of exponents in a multivariate monomial
    - ◇ Quotients of expressions involving exponents
    - ◇ Multiplying monomials
    - ◇ Power rule: Positive exponents

- ◇ Ordering numbers with positive exponents
- ◇ Writing a positive number without a negative exponent
- ◇ Writing a negative number without a negative exponent
- ◇ Power rule: Negative exponents
- ◇ Ordering numbers with negative exponents
- ◇ Scientific notation with positive exponent
- ◇ Scientific notation with negative exponent
- ◇ Multiplying and dividing numbers written in scientific notation
- ◆ Polynomial Arithmetic
  - ◇ Evaluation of a polynomial in one variable
  - ◇ Simplifying a polynomial expression
  - ◇ Degree of a multivariate polynomial
  - ◇ Multiplying two binomials
  - ◇ Squaring a binomial
  - ◇ Multiplying polynomials
  - ◇ Polynomial long division: Problem type 1
- ◆ Factoring
  - ◇ Greatest common factor of two monomials
  - ◇ Least common multiple of two monomials
  - ◇ Factoring a quadratic with leading coefficient 1
  - ◇ Factoring a quadratic with leading coefficient greater than 1
  - ◇ 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 product of a quadratic trinomial and a monomial
  - ◇ Completing the square
- Equations and Inequalities
  - ◆ Linear Equations
    - ◇ Evaluation of a linear expression in two variables
    - ◇ Additive property of equality: Problem type 2
    - ◇ Multiplicative property of equality: Problem type 2
    - ◇ Solving a linear equation: Problem type 1
    - ◇ Solving a linear equation: Problem type 2
    - ◇ Solving a linear equation: Problem type 3
    - ◇ Solving a linear equation with several occurrences of the variable: Problem type 1
    - ◇ Solving a linear equation with several occurrences of the variable: Problem type 2
    - ◇ Solving a linear equation with several occurrences of the variable: Problem type 3
    - ◇ Solving a linear equation with several occurrences of the variable: Problem type 4
    - ◇ Solving a linear equation with several occurrences of the variable: Problem type 5
    - ◇ Writing a mathematical expression
    - ◇ Translating sentences into equations
    - ◇ Solving a word problem using a linear equation: Problem type 1
    - ◇ Solving a word problem using a linear equation: Problem type 2
    - ◇ Solving a word problem using a linear equation: Problem type 3
    - ◇ Solving a word problem using a linear equation: Problem type 4
  - ◆ Linear Inequalities and Absolute Values
    - ◇ Graphing a linear inequality on the number line
    - ◇ Graphing a compound linear 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 an equation involving absolute value: Basic
- ◇ Solving an inequality involving absolute value: Basic
- ◇ Translating sentences into inequalities
- ◆ Systems of Linear Equations
  - ◇ Solving a system of linear equations
  - ◇ Solving a word problem using a system of linear equations: Problem type 1
  - ◇ Solving a word problem using a system of linear equations: Problem type 2
  - ◇ Graphically solving a system of linear equations
  - ◇ Interpreting the graphs of two functions
  - ◇ Graphing a system of linear inequalities
- ◆ Quadratic Equations
  - ◇ Solving equations 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 equations of the form  $x^2 = a$
  - ◇ Solving a quadratic equation using the quadratic formula
  - ◇ Discriminant of a quadratic equation
  - ◇ Solving a word problem using a quadratic equation with rational roots
  - ◇ Solving a word problem using a quadratic equation with irrational roots
  - ◇ Solving a quadratic inequality
- Linear and Quadratic Functions
  - ◆ Graphs and Functions
    - ◇ Set builder notation
    - ◇ Union and intersection of finite sets
    - ◇ Set builder and interval notation
    - ◇ Vertical line test
    - ◇ Introduction to functions: Notation and graphs
    - ◇ Domain and range: Problem type 1
    - ◇ Domain and range: Problem type 2
    - ◇ Sum, difference, and product of two functions
    - ◇ Composition of two functions: Basic
    - ◇ Horizontal line test
    - ◇ Inverse functions: Basic
    - ◇ Vertical translation of the graph of a function
    - ◇ Vertical and horizontal translations of the graph of a function
    - ◇ Classifying the graph of a function
  - ◆ Linear Functions
    - ◇ Reading a point in the coordinate plane
    - ◇ Plotting a point in the coordinate plane
    - ◇ Solutions to a linear equation in two variables: Problem type 1
    - ◇ Solutions to a linear equation in two variables: Problem type 2
    - ◇ Y–intercept of a line
    - ◇ X– and y–intercepts of a line given the equation in standard form
    - ◇ Finding the slope of a line given its equation
    - ◇ Determining the slope of a line given its graph
    - ◇ Graphing a line given the 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 vertical or horizontal line
    - ◇ Graphing a linear inequality in the plane: Problem type 1
    - ◇ Graphing a linear inequality in the plane: Problem type 2

- ◇ Graphing a linear inequality in the plane: Problem type 3
- ◇ Graphing a line through a given point with a given slope
- ◇ Graphing an equation involving absolute value in the plane
- ◇ Writing an equation of a line given the  $y$ -intercept and a point
- ◇ Writing the equation of a line given the slope and a point on the line
- ◇ Writing the equations of vertical and horizontal lines through a given point
- ◇ Writing the equation of the line through two given points
- ◇ Slopes of parallel and perpendicular lines: Problem type 1
- ◇ Slopes of parallel and perpendicular lines: Problem type 2
- ◇ Writing equations and drawing graphs to fit a narrative
- ◇ Application problem with a linear function: Problem type 1
- ◇ Application problem with a linear function: Problem type 2
- ◆ Parabolas
  - ◇ Finding the  $x$ -intercept(s) and the vertex of a parabola
  - ◇ Graphing a parabola: Problem type 1
  - ◇ Graphing a parabola: Problem type 2
- Rational Expressions
  - ◆ Rational Expressions
    - ◇ Ordering fractions with variables
    - ◇ Ratio of multivariate polynomials
    - ◇ Simplifying a ratio of polynomials: Problem type 1
    - ◇ Simplifying a ratio of polynomials: Problem type 2
    - ◇ Multiplying rational expressions: Problem type 1
    - ◇ Multiplying rational expressions: Problem type 2
    - ◇ Dividing rational expressions
    - ◇ Complex fraction: Problem type 1
    - ◇ Adding rational expressions with common denominator
    - ◇ Adding rational expressions
    - ◇ Adding rational expressions with different denominators
    - ◇ Adding and subtracting rational expressions: Problem type 1
    - ◇ Domain of a rational function
  - ◆ Rational Equations
    - ◇ Solving a rational equation that simplifies to a linear equation: Problem type 1
    - ◇ Solving a rational equation that simplifies to a linear equation: Problem type 2
    - ◇ Solving a rational equation that simplifies to a linear equation: Problem type 3
    - ◇ Solving a rational equation that simplifies to a quadratic equation: Problem type 1
    - ◇ Solving a rational equation that simplifies to a quadratic equation: Problem type 2
  - ◆ Applications of Rational Expressions
    - ◇ Algebraic symbol manipulation
    - ◇ Word problem on direct variation
    - ◇ Word problem on inverse variation
- Radical Expressions
  - ◆ Radical Expressions
    - ◇ Square root of a perfect square
    - ◇ Square root of a rational perfect square
    - ◇ Square root simplification
    - ◇ Square root addition
    - ◇ Square root multiplication
    - ◇ Simplifying a radical expression: Problem type 1
    - ◇ Simplifying a radical expression: Problem type 2
    - ◇ Simplifying a sum of radical expressions

- ◇ Simplifying a product of radical expressions
- ◇ Simplifying a product of radical expressions using the distributive property
- ◇ Rationalizing the denominator of a radical expression
- ◇ Rationalizing the denominator of a radical expression using conjugates
- ◇ Solving an equation with radicals: Problem type 1
- ◇ Solving an equation with radicals: Problem type 2
- ◇ Solving an equation with radicals: Problem type 3
- ◇ Domain of a square root function
- ◆ Higher Roots and Rational Exponents
  - ◇ Cube root of an integer
  - ◇ Converting between radical form and exponent form
  - ◇ Simplifying a higher radical: Problem type 1
  - ◇ Simplifying a higher radical: Problem type 2
  - ◇ Rational exponents: Basic
  - ◇ Rational exponents: Negative exponents and fractional bases
  - ◇ Rational exponents: Powers of powers
- ◆ Complex Numbers
  - ◇ Adding and subtracting complex numbers
  - ◇ Multiplying complex numbers
  - ◇ Simplifying a power of  $i$
  - ◇ Dividing complex numbers
  - ◇ Solving a quadratic equation with imaginary roots
- Geometry
  - ◆ Perimeter, Area, and Volume
    - ◇ Perimeter of a square or a rectangle
    - ◇ Area of a square or a rectangle
    - ◇ Area of a piecewise rectangular figure
    - ◇ Finding the side length of a rectangle given its perimeter or area
    - ◇ Areas of rectangles with the same perimeter
    - ◇ Area and perimeter of a rectangle
    - ◇ Circumference and area of a circle
    - ◇ Finding the radius or the diameter of a circle given its circumference
    - ◇ Perimeter involving rectangles and circles
    - ◇ Circumference ratios
    - ◇ Area between two concentric circles
    - ◇ Area involving rectangles and circles: Advanced problem
    - ◇ Volume of a cube or a rectangular prism
    - ◇ Volume of a cylinder
    - ◇ Rate of filling of a solid
    - ◇ Surface area of a cube or a rectangular prism
    - ◇ Surface area of a cylinder
  - ◆ Coordinate Geometry
    - ◇ Pythagorean Theorem
    - ◇ Distance between two points in the plane
    - ◇ Midpoint of a line segment in the plane
    - ◇ 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