ALEKS®

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

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- ◊ 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)

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- ◊ 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)

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- ◊ 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

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        - ◊ 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

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- ◊ 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

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- ◊ 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
- ◊ Composition of two functions: Basic
- ◊ Horizontal line test
- ◊ Determining whether two functions are inverses of each other
- ◊ Inverse functions: Problem type 1

♦ 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

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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.*

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