ALEKS®

College Algebra with Trigonometry

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

Curriculum (582 topics)

- Algebra and Geometry Review (184 topics)
  - ♦ Real Numbers and Algebraic Expressions (18 topics)
    - ◊ Ordering integers
    - ◊ Identifying numbers as integers or non−integers
    - ◊ Identifying numbers as rational or irrational
    - ◊ Signed fraction addition or subtraction: Basic
    - ◊ Signed fraction subtraction involving double negation
    - ◊ Signed fraction multiplication: Basic
    - ◊ Signed fraction division
    - ◊ Exponents and integers: Problem type 1
    - ◊ Exponents and integers: Problem type 2
    - ◊ Exponents and signed fractions
    - ◊ Order of operations with integers
    - ◊ Order of operations with integers and exponents
    - ◊ Evaluating a linear expression: Integer multiplication with addition or subtraction
    - ◊ Evaluating a quadratic expression: Integers
    - ◊ Evaluating a linear expression: Signed fraction multiplication with addition or subtraction
    - ◊ Distributive property: Integer coefficients
    - ◊ Using distribution and combining like terms to simplify: Univariate
    - ◊ Using distribution with double negation and combining like terms to simplify: Multivariate
  - ♦ Exponents (28 topics)
    - ◊ Introduction to the product rule of exponents
    - ◊ Product rule with positive exponents: Univariate
    - ◊ Product rule with positive exponents: Multivariate
    - ◊ Introduction to the power of a power rule of exponents
    - ◊ Introduction to the power of a product rule of exponents
    - ◊ Power rules with positive exponents: Multivariate products
    - ◊ Power rules with positive exponents: Multivariate quotients
    - ◊ Power and product rules with positive exponents
    - ◊ Simplifying a ratio of multivariate monomials: Basic
    - ◊ Introduction to the quotient rule of exponents
    - ◊ Simplifying a ratio of univariate monomials
    - ◊ Quotient of expressions involving exponents
    - ◊ Simplifying a ratio of multivariate monomials: Advanced
    - ◊ Power and quotient rules with positive exponents
    - ◊ Evaluating expressions with exponents of zero
    - ◊ Evaluating an expression with a negative exponent: Whole number base
    - ◊ 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 with negative exponents
- ◊ Product rule with negative exponents
- ◊ Quotient rule with negative exponents: Problem type 1
- ◊ Quotient rule with negative exponents: Problem type 2
- ◊ Power of a power rule with negative exponents
- ◊ Power rules with negative exponents
- ◊ Power and quotient rules with negative exponents: Problem type 1
- ◊ Power and quotient rules with negative exponents: Problem type 2
- ◊ Power, product, and quotient rules with negative exponents

♦ Polynomial Expressions (15 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 a univariate polynomial by a monomial with a negative coefficient
- ◊ Multiplying a multivariate polynomial by a monomial
- ◊ Multiplying binomials with leading coefficients of 1
- ◊ Multiplying binomials with leading coefficients greater than 1
- ◊ Multiplying binomials in two variables
- ◊ Multiplying conjugate binomials: Univariate
- ◊ Multiplying conjugate binomials: Multivariate
- ◊ Squaring a binomial: Univariate
- ◊ Squaring a binomial: Multivariate
- ◊ Multiplying binomials with negative coefficients
- ◊ Multiplication involving binomials and trinomials in one variable
- ◊ Multiplication involving binomials and trinomials in two variables

♦ Factoring Polynomials (29 topics)

- ◊ Greatest common factor of 2 numbers
- ◊ Factoring a linear binomial
- ◊ Introduction to the GCF of two monomials
- ◊ Greatest common factor of three univariate 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 out a binomial from a polynomial: Basic
- ◊ Factoring a univariate polynomial by grouping: Problem type 1
- ◊ Factoring a univariate polynomial by grouping: Problem type 2
- ◊ Factoring a multivariate polynomial by grouping: Problem type 1
- ◊ Factoring a quadratic with leading coefficient 1
- ◊ Factoring a quadratic in two variables with leading coefficient 1
- ◊ Factoring out a constant before factoring a quadratic
- ◊ Factoring a quadratic with leading coefficient greater than 1: Problem type 1
- ◊ Factoring a quadratic with leading coefficient greater than 1: Problem type 2
- ◊ Factoring a quadratic with leading coefficient greater than 1: Problem type 3
- ◊ Factoring a quadratic in two variables with leading coefficient greater than 1
- ◊ Factoring a quadratic with a negative leading coefficient
- ◊ Factoring a perfect square trinomial with leading coefficient 1
- ◊ Factoring a perfect square trinomial with leading coefficient greater than 1
- ◊ Factoring a difference of squares in one variable: Basic
- ◊ Factoring a difference of squares in one variable: Advanced
- ◊ Factoring a difference of squares in two variables
- ◊ Factoring a polynomial involving a GCF and a difference of squares: Univariate
- ◊ Factoring a product of a quadratic trinomial and a monomial
- ◊ Factoring with repeated use of the difference of squares formula

- ◊ Factoring a sum or difference of two cubes
- ◊ Factoring out a binomial from a polynomial: Advanced

♦ Rational Expressions (43 topics)

- ◊ Restriction on a variable in a denominator: Linear
- ◊ Simplifying a ratio of factored polynomials: Linear factors
- ◊ Simplifying a ratio of polynomials using GCF factoring
- ◊ Simplifying a ratio of linear polynomials: 1, −1, and no simplification
- ◊ Simplifying a ratio of polynomials by factoring a quadratic with leading coefficient 1
- ◊ 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 made up of linear expressions
- ◊ Multiplying rational expressions involving quadratics with leading coefficients of 1
- ◊ Dividing rational expressions involving multivariate monomials
- ◊ Dividing rational expressions involving linear expressions
- ◊ Dividing rational expressions involving quadratics with leading coefficients of 1
- ◊ Least common multiple of 2 numbers
- ◊ Least common multiple of 3 numbers
- ◊ Introduction to the LCM of two monomials
- ◊ Finding the LCD of rational expressions with linear denominators: Relatively prime
- ◊ Finding the LCD of rational expressions with linear denominators: Common factors
- ◊ Writing equivalent rational expressions with monomial denominators
- ◊ Writing equivalent rational expressions with polynomial denominators
- ◊ Writing equivalent rational expressions involving opposite factors
- ◊ Introduction to adding fractions with variables and common denominators
- ◊ Adding rational expressions with common denominators and monomial numerators
- ◊ Adding rational expressions with common denominators and binomial numerators
- ◊ Adding rational expressions with common denominators and GCF factoring
- ◊ Adding rational expressions with common denominators and quadratic factoring
- ◊ Adding rational expressions with different denominators and a single occurrence of a variable
- ◊ Adding rational expressions with denominators ax and bx: Basic
- ◊ Adding rational expressions with denominators ax and bx: Advanced
- ◊ Adding rational expressions with denominators ax^n and bx^m
- ◊ Adding rational expressions with linear denominators without common factors: Basic
- ◊ Adding rational expressions with linear denominators without common factors: Advanced
- ◊ Adding rational expressions with linear denominators with common factors: Basic
- ◊ Adding rational expressions with denominators ax−b and b−ax
- ◊ Complex fraction without variables: Problem type 1
- ◊ Complex fraction without variables: Problem type 2
- ◊ Complex fraction involving univariate monomials
- ◊ Complex fraction: GCF factoring
- ◊ Complex fraction: Quadratic factoring
- ◊ Complex fraction made of sums involving rational expressions: Problem type 1
- ◊ Complex fraction made of sums involving rational expressions: Problem type 2
- ◊ Complex fraction made of sums involving rational expressions: Problem type 3
- ◊ Complex fraction made of sums involving rational expressions: Problem type 4

♦ Perfect Squares and nth Roots (10 topics)

- ◊ Finding all square roots of a number
- ◊ Square root of a rational perfect square
- ◊ Square roots of perfect squares with signs
- ◊ Square roots of integers raised to even exponents
- ◊ Introduction to simplifying a radical expression with an even exponent
- ◊ Square root of a perfect square monomial

- ◊ Introduction to solving an absolute value equation
- ◊ Cube root of an integer
- ◊ Finding n^{th} roots of perfect n^{th} powers with signs
- ◊ Finding the n^{th} root of a perfect n^{th} power monomial

♦ Rational Exponents (8 topics)

- ◊ Converting between radical form and exponent form
- ◊ Rational exponents: Unit fraction exponents and whole number bases
- ◊ Rational exponents: Unit fraction exponents and bases involving signs
- ◊ Rational exponents: Non−unit fraction exponent with a whole number base
- ◊ Rational exponents: Negative exponents and fractional bases
- ◊ Rational exponents: Product rule
- ◊ Rational exponents: Quotient rule
- ◊ Rational exponents: Power of a power rule

♦ Radical Expressions (28 topics)

- ◊ Simplifying the square root of a whole number less than 100
- ◊ Simplifying the square root of a whole number greater than 100
- ◊ Simplifying a radical expression with an even exponent
- ◊ Introduction to simplifying a radical expression with an odd exponent
- ◊ Simplifying a radical expression with an odd exponent
- ◊ Simplifying a radical expression with two variables
- ◊ Simplifying a higher root of a whole number
- ◊ Introduction to simplifying a higher radical expression
- ◊ Simplifying a higher radical expression: Univariate
- ◊ Introduction to square root addition or subtraction
- ◊ Square root addition or subtraction
- ◊ Introduction to simplifying a sum or difference of radical expressions: Univariate
- ◊ Simplifying a sum or difference of radical expressions: Univariate
- ◊ Introduction to square root multiplication
- ◊ Square root multiplication: Basic
- ◊ Square root multiplication: Advanced
- ◊ Introduction to simplifying a product of radical expressions: Univariate
- ◊ Simplifying a product of radical expressions: Univariate
- ◊ Introduction to simplifying a product involving square roots using the distributive property
- ◊ Simplifying a product involving square roots using the distributive property: Basic
- ◊ Simplifying a product involving square roots using the distributive property: Advanced
- ◊ Special products of radical expressions: Conjugates and squaring
- ◊ Simplifying a quotient of square roots
- ◊ Simplifying a quotient involving a sum or difference with a square root
- ◊ Rationalizing a denominator: Quotient involving square roots
- ◊ Rationalizing a denominator: Square root of a fraction
- ◊ Rationalizing a denominator using conjugates: Integer numerator
- ◊ Rationalizing a denominator using conjugates: Square root in numerator

♦ Geometry (5 topics)

- ◊ Circumference of a circle
- ◊ Volume of a rectangular prism
- ◊ Introduction to the Pythagorean Theorem
- ◊ Pythagorean Theorem
- ◊ Word problem involving the Pythagorean Theorem

• Equations and Inequalities (118 topics)

♦ Linear Equations and Applications (34 topics)

- ◊ Additive property of equality with signed fractions
- ◊ Multiplicative property of equality with signed fractions
- ◊ Solving a multi−step equation given in fractional form

- ◊ 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 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 monomial numerators
- ◊ Solving a two−step equation with signed fractions
- ◊ 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: Fractional forms with binomial numerators
- ◊ Solving equations with zero, one, or infinitely many solutions
- ◊ Solving a proportion of the form $(x+a)/b = c/d$
- ◊ Solving for a variable in terms of other variables using addition or subtraction: Basic
- ◊ Solving for a variable in terms of other variables using addition or subtraction: Advanced
- ◊ Solving for a variable in terms of other variables using multiplication or division: Basic
- ◊ Solving for a variable in terms of other variables using multiplication or division: Advanced
- ◊ Solving for a variable in terms of other variables using addition or subtraction with division
- ◊ Solving for a variable inside parentheses in terms of other variables
- ◊ Solving for a variable in terms of other variables in a linear equation with fractions
- ◊ Translating a sentence into a one−step equation
- ◊ Translating a sentence into a multi−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 word problem with three unknowns using a linear equation
- ◊ Writing a multi−step equation for a real−world situation
- ◊ Solving a value mixture problem using a linear equation
- ◊ Solving a one−step word problem using the formula $d = rt$
- ◊ Solving a distance, rate, time problem using a linear equation
- ◊ Finding the perimeter or area of a rectangle given one of these values
- ◊ Finding the multiplier to give a final amount after a percentage increase or decrease
- ◊ Finding the sale price given the original price and percent discount
- ◊ Computing a percent mixture
- ◊ Solving a percent mixture problem using a linear equation
- ◊ Finding simple interest without a calculator

♦ Absolute Value Equations (4 topics)

- ◊ Solving an absolute value equation: Problem type 1
- ◊ Solving an absolute value equation: Problem type 2
- ◊ Solving an absolute value equation: Problem type 3
- ◊ Solving an absolute value equation: Problem type 4

♦ Linear Inequalities and Applications (21 topics)

- ◊ Translating a sentence into a one−step inequality
- ◊ Translating a sentence into a multi−step inequality
- ◊ Writing an inequality for a real−world situation
- ◊ Graphing a linear inequality on the number line
- ◊ Translating a sentence into a compound inequality
- ◊ Graphing a compound inequality on the number line
- ◊ Set builder and interval notation
- ◊ Union and intersection of finite sets
- ◊ Union and intersection of intervals
- ◊ Identifying solutions to a two−step linear inequality in one variable

- ◊ Additive property of inequality with signed fractions
- ◊ Multiplicative property of inequality with signed fractions
- ◊ Solving a two−step linear inequality: Problem type 1
- ◊ Solving a two−step linear inequality: Problem type 2
- ◊ Solving a two−step linear inequality with a fractional coefficient
- ◊ Solving a linear inequality with multiple occurrences of the variable: Problem type 1
- ◊ Solving a linear inequality with multiple occurrences of the variable: Problem type 2
- ◊ Solving a linear inequality with multiple occurrences of the variable: Problem type 3
- ◊ Solving a compound linear inequality: Graph solution, basic
- ◊ Solving a decimal word problem using a two−step linear inequality
- ◊ Solving a decimal word problem using a linear inequality with the variable on both sides

♦ Absolute Value Inequalities (5 topics)

- ◊ Solving an absolute value inequality: Problem type 1
- ◊ Solving an absolute value inequality: Problem type 2
- ◊ Solving an absolute value inequality: Problem type 3
- ◊ Solving an absolute value inequality: Problem type 4
- ◊ Solving an absolute value inequality: Problem type 5

♦ Rational Equations that Simplify to Linear (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: Denominators a, x, or ax
- ◊ Solving a rational equation that simplifies to linear: Denominators ax and bx
- ◊ Solving a rational equation that simplifies to linear: Like binomial denominators
- ◊ Solving a rational equation that simplifies to linear: Unlike binomial denominators
- ◊ Solving for a variable in terms of other variables in a rational equation: Problem type 1
- ◊ Solving for a variable in terms of other variables in a rational equation: Problem type 2

♦ Complex Numbers (6 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

♦ Quadratic Equations (20 topics)

- ◊ Solving an equation written in factored form
- ◊ Finding the roots of a quadratic equation of the form $ax^2 + bx = 0$
- ◊ 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
- ◊ Roots of a product of polynomials
- ◊ Writing a quadratic equation given the roots and the leading coefficient
- ◊ Solving a word problem using a quadratic equation with rational roots
- ◊ Solving an equation of the form $x^2 = a$ using the square root property
- ◊ 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
- ◊ Applying the quadratic formula: Decimal answers
- ◊ Solving a quadratic equation with complex roots
- ◊ Discriminant of a quadratic equation
- ◊ Solving a word problem using a quadratic equation with irrational roots

- ◊ Solving an equation using the odd−root property: Problem type 1
- ◊ Solving an equation using the odd−root property: Problem type 2

♦ Rational Equations that Simplify to Quadratic (6 topics)

- ◊ Restriction on a variable in a denominator: Quadratic
- ◊ Solving a rational equation that simplifies to linear: Factorable quadratic denominator
- ◊ Solving a rational equation that simplifies to quadratic: Proportional form, basic
- ◊ Solving a rational equation that simplifies to quadratic: Denominator x
- ◊ Solving a rational equation that simplifies to quadratic: Binomial denominators, constant numerators
- ◊ Solving a rational equation that simplifies to quadratic: Binomial denominators and numerators

♦ Radical Equations (13 topics)

- ◊ Introduction to solving a radical equation
- ◊ Solving a radical equation that simplifies to a linear equation: One radical, basic
- ◊ Solving a radical equation that simplifies to a linear equation: One radical, advanced
- ◊ Solving a radical equation that simplifies to a linear equation: Two radicals
- ◊ Solving a radical equation that simplifies to a quadratic equation: One radical, basic
- ◊ Solving a radical equation that simplifies to a quadratic equation: One radical, advanced
- ◊ Solving a radical equation that simplifies to a quadratic equation: Two radicals
- ◊ Algebraic symbol manipulation with radicals
- ◊ Word problem involving radical equations: Basic
- ◊ Word problem involving radical equations: Advanced
- ◊ Solving an equation with a root index greater than 2: Problem type 1
- ◊ Solving an equation with a root index greater than 2: Problem type 2
- ◊ Solving an equation that can be written in quadratic form: Problem type 1

• Graphs and Functions (116 topics)

♦ Graphs of Equations (20 topics)

- ◊ Reading a point in the coordinate plane
- ◊ Plotting a point in the coordinate plane
- ◊ Table for a linear equation
- ◊ Identifying solutions to a linear equation in two variables
- ◊ Finding a solution to a linear equation in two variables
- ◊ Graphing a linear equation of the form $y = mx$
- ◊ Graphing a line given its equation in slope−intercept form: Integer slope
- ◊ Graphing a line given its equation in slope−intercept form: Fractional slope
- ◊ Graphing a line given its equation in standard form
- ◊ Graphing a vertical or horizontal line
- ◊ Finding x− and y−intercepts given the graph of a line on a grid
- ◊ Finding x− and y−intercepts of a line given the equation: Basic
- ◊ Finding x− and y−intercepts of a line given the equation: Advanced
- ◊ Graphing a line given its x− and y−intercepts
- ◊ Graphing a line by first finding its x− and y−intercepts
- ◊ Finding intercepts of a nonlinear function given its graph
- ◊ Graphing an absolute value equation of the form $y = A|x|$
- ◊ Graphing a parabola of the form $y = ax^2$
- ◊ Graphing a parabola of the form $y = ax^2 + c$
- ◊ Graphing a cubic function of the form $y = ax^3$

♦ Slope and Equations of Lines (20 topics)

- ◊ Classifying slopes given graphs of lines
- ◊ Finding slope given the graph of a line on a grid
- ◊ Finding slope given two points on the line
- ◊ Finding the slope of horizontal and vertical lines
- ◊ Graphing a line given its slope and y−intercept
- ◊ Graphing a line through a given point with a given slope
- ◊ Rewriting a linear equation in the form $Ax + By = C$

- ◊ Finding the slope and y−intercept of a line given its equation in the form y = mx + b
- ◊ Finding the slope and y−intercept of a line given its equation in the form Ax + By = C
- ◊ Graphing a line by first finding its slope and y−intercept
- ◊ Writing an equation of a line given its slope and y−intercept
- ◊ Writing an equation in slope−intercept form given the slope and a point
- ◊ Writing an equation in point−slope form given the slope and a point
- ◊ Writing an equation of a line given the y−intercept and another point
- ◊ Writing the equation of the line through two given points
- ◊ Writing the equations of vertical and horizontal lines through a given point
- ◊ Finding slopes of lines parallel and perpendicular to a line given in slope−intercept form
- ◊ Finding slopes of lines parallel and perpendicular to a line given in the form Ax + By = C
- ◊ Identifying parallel and perpendicular lines from equations
- ◊ Writing equations of lines parallel and perpendicular to a given line through a point

♦ Linear Applications (5 topics)

- ◊ Writing and evaluating a function that models a real−world situation: Advanced
- ◊ Writing an equation and drawing its graph to model a real−world situation: Advanced
- ◊ Interpreting the parameters of a linear function that models a real−world situation
- ◊ 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

♦ Distance and Midpoint Formulas; Circles (6 topics)

- ◊ 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: Basic
- ◊ 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

♦ Functions (21 topics)

- ◊ Identifying functions from relations
- ◊ Vertical line test
- ◊ Table for a linear function
- ◊ Evaluating functions: Linear and quadratic or cubic
- ◊ Evaluating a rational function: Problem type 1
- ◊ Evaluating a rational function: Problem type 2
- ◊ Table for a square root function
- ◊ Evaluating functions: Absolute value, rational, radical
- ◊ Evaluating a piecewise−defined function
- ◊ Variable expressions as inputs of functions
- ◊ Domain and range from ordered pairs
- ◊ Domain of a rational function
- ◊ Domain of a square root function: Basic
- ◊ Domain of a square root function: Advanced
- ◊ Finding the domain of a fractional function involving radicals
- ◊ Determining whether an equation defines a function: Basic
- ◊ Determining whether an equation defines a function: Advanced
- ◊ Finding outputs of a one−step function that models a real−world situation: Function notation
- ◊ Finding outputs of a two−step function with decimals that models a real−world situation: Function notation
- ◊ Finding inputs and outputs of a two−step function that models a real−world situation: Function notation
- ◊ Finding a difference quotient for a function

♦ Graphs of Functions (20 topics)

- ◊ Finding an output of a function from its graph
- ◊ Finding inputs and outputs of a function from its graph

- ◊ Domain and range from the graph of a discrete relation
- ◊ Domain and range from the graph of a continuous function
- ◊ Domain and range from the graph of a piecewise function
- ◊ Finding where a function is increasing, decreasing, or constant given the 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
- ◊ Graphing a function of the form $f(x) = ax + b$: Integer slope
- ◊ Graphing a function of the form $f(x) = ax + b$: Fractional slope
- ◊ Graphing an absolute value equation in the plane: Basic
- ◊ Graphing an absolute value equation in the plane: Advanced
- ◊ Graphing a function of the form $f(x) = ax^2$
- ◊ Graphing a function of the form $f(x) = ax^2 + c$
- ◊ Graphing a parabola of the form $y = (x-a)^2 + c$
- ◊ Graphing a square root function: Problem type 1
- ◊ Graphing a square root function: Problem type 2
- ◊ Graphing a piecewise−defined function
- ◊ Finding the average rate of change of a function
- ◊ Finding the average rate of change of a function given its graph

♦ Transformations (12 topics)

- ◊ Even and odd functions
- ◊ Translating the graph of a parabola: One step
- ◊ How the leading coefficient affects the shape of a parabola
- ◊ Translating the graph of an absolute value function: One step
- ◊ Translating the graph of an absolute value function: Two steps
- ◊ Writing an equation for a function after a vertical 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
- ◊ Transforming the graph of a function using more than one transformation
- ◊ Writing an equation for a function after a vertical and horizontal translation

♦ Combining Functions; Composite Functions; Inverse Functions (12 topics)

- ◊ Sum, difference, and product of two functions
- ◊ Quotient of two functions
- ◊ Combining functions: Advanced
- ◊ Composition of two functions: Basic
- ◊ Expressing a function as a composition of two functions
- ◊ Composition of two functions: Domain and range
- ◊ Composition of two functions: Advanced
- ◊ Horizontal line test
- ◊ Determining whether two functions are inverses of each other
- ◊ Inverse functions: Problem type 1
- ◊ Inverse functions: Problem type 2
- ◊ Inverse functions: Problem type 3

• Polynomial and Rational Functions (52 topics)

♦ Quadratic Functions (11 topics)

- ◊ Finding the vertex, x−intercepts, and axis of symmetry from the graph of a parabola
- ◊ Graphing a parabola of the form $y = x^2 + bx + c$
- ◊ Graphing a parabola of the form $y = ax^2 + bx + c$: Integer coefficients
- ◊ Finding the x−intercept(s) and the vertex of a parabola
- ◊ Using a graphing calculator to find the x−intercept(s) and vertex of a quadratic function
- ◊ Rewriting a quadratic function to find the vertex of its graph
- ◊ Finding the maximum or minimum of a quadratic function

- ◊ Word problem involving the maximum or minimum of a quadratic function
- ◊ Domain and range from the graph of a parabola
- ◊ Range of a quadratic function
- ◊ Writing the equation of a quadratic function given its graph

♦ Polynomial Functions (8 topics)

- ◊ Finding zeros of a polynomial function written in factored form
- ◊ Finding a polynomial of a given degree with given zeros: Real zeros
- ◊ Finding x− and y−intercepts given a polynomial function
- ◊ Determining the end behavior of the graph of a polynomial function
- ◊ Matching graphs with polynomial functions
- ◊ Inferring properties of a polynomial function from its graph
- ◊ Using a graphing calculator to find local extrema of a polynomial function
- ◊ Using a graphing calculator to solve a word problem involving a local extremum of a polynomial function

♦ Division of Polynomials; Remainder and Factor Theorems (6 topics)

- ◊ 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 (7 topics)

- ◊ Using a given zero to write a polynomial as a product of linear factors: 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
- ◊ Using a graphing calculator to find zeros of a polynomial function
- ◊ Using a graphing calculator to solve a word problem involving a polynomial of degree 3

♦ Complex Zeros of Polynomials Functions (6 topics)

- ◊ Multiplying expressions involving complex conjugates
- ◊ Finding a polynomial of a given degree with given zeros: Complex zeros
- ◊ Using a given zero to write a polynomial as a product of linear factors: Complex zeros
- ◊ Using the rational zeros theorem to find all zeros of a polynomial: Complex zeros
- ◊ Using the conjugate zeros theorem to find all zeros of a polynomial
- ◊ Linear factors theorem and conjugate zeros theorem

♦ Rational Functions (9 topics)

- ◊ Finding the asymptotes of a rational function: Constant over linear
- ◊ Finding the asymptotes of a rational function: Linear over linear
- ◊ Finding the asymptotes of a rational function: Advanced
- ◊ Graphing a rational function: Constant over linear
- ◊ Graphing a rational function: Linear over linear
- ◊ Graphing a rational function: Problem type 2
- ◊ Graphing rational functions with holes
- ◊ Matching graphs with rational functions: Two vertical asymptotes
- ◊ Writing the equation of a rational function given its graph

♦ Polynomial and Rational Inequalities (5 topics)

- ◊ Solving a quadratic inequality written in factored form
- ◊ Solving a quadratic inequality
- ◊ Solving a polynomial inequality
- ◊ Solving a rational inequality: Problem type 1
- ◊ Solving a rational inequality: Problem type 2

• Exponential and Logarithmic Functions (34 topics)

- Graphing Exponential Functions (5 topics)
  - ◊ Table for an exponential function
  - ◊ Graphing an exponential function and its asymptote: $f(x) = a(b)^x$
  - ◊ Translating the graph of an exponential function
  - ◊ The graph, domain, and range of an exponential function
  - ◊ Graphing an exponential function and its asymptote: $f(x) = a(e)^{x-b} + c$
- Applications of Exponential Functions (5 topics)
  - ◊ Evaluating an exponential function that models a real−world situation
  - ◊ Evaluating an exponential function with base e that models a real−world situation
  - ◊ Introduction to compound interest
  - ◊ Finding a final amount in a word problem on exponential growth or decay
  - ◊ Compound interest
- Logarithmic Functions (7 topics)
  - ◊ Converting between logarithmic and exponential equations
  - ◊ Converting between natural logarithmic and exponential equations
  - ◊ Evaluating a logarithmic expression
  - ◊ Solving an equation of the form $\log_b a = c$
  - ◊ Translating the graph of a logarithmic function
  - ◊ Graphing a logarithmic function: Basic
  - ◊ The graph, domain, and range of a logarithmic function
- Properties of Logarithms (5 topics)
  - ◊ Basic properties of logarithms
  - ◊ Expanding a logarithmic expression: Problem type 1
  - ◊ Expanding a logarithmic expression: Problem type 2
  - ◊ Writing an expression as a single logarithm
  - ◊ Change of base for logarithms: Problem type 1
- Logarithmic and Exponential Equations and Applications (12 topics)
  - ◊ 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 1
  - ◊ Solving an equation involving logarithms on both sides: Problem type 2
  - ◊ Solving an exponential equation by finding common bases: Linear exponents
  - ◊ Solving an exponential equation by finding common bases: Linear and quadratic exponents
  - ◊ Solving an exponential equation by using logarithms: Decimal answers
  - ◊ Solving an exponential equation by using natural logarithms: Decimal answers
  - ◊ Solving an exponential equation by using logarithms: Exact answers in logarithmic form
  - ◊ 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 exponential growth or decay

- Trigonometric Functions (45 topics)
  - Angles and Their Measure (5 topics)
    - ◊ 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
    - ◊ Arc length and central angle measure
  - The Unit Circle and Right Triangle Trigonometry (15 topics)
    - ◊ Finding coordinates on the unit circle for special angles
    - ◊ Finding a point on the unit circle given one coordinate
    - ◊ Sine, cosine, and tangent ratios: Variables for side lengths
    - ◊ Trigonometric functions and special angles: Problem type 1
    - ◊ Finding trigonometric ratios from a point on the unit circle
    - ◊ Trigonometric functions and special angles: Problem type 2

- ◊ Trigonometric functions and special angles: Problem type 3
- ◊ Using a calculator to approximate sine, cosine, and tangent values
- ◊ Using the Pythagorean Theorem to find a trigonometric ratio
- ◊ Finding trigonometric ratios given a right triangle
- ◊ Using a trigonometric ratio to find a side length in a right triangle
- ◊ Using trigonometry to find distances
- ◊ Using a trigonometric ratio to find an angle measure in a right triangle
- ◊ Using trigonometry to find angles of elevation or depression
- ◊ Solving a right triangle

♦ Trigonometric Functions of Angles (6 topics)
- ◊ Reference angles: Problem type 1
- ◊ Reference angles: Problem type 2
- ◊ Determining the location of a terminal point given the signs of trigonometric values
- ◊ 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

♦ Graphs of Sine and Cosine Functions (9 topics)
- ◊ Sketching the graph of a sine or cosine function: Problem type 1
- ◊ Sketching the graph of a sine or cosine function: Problem type 2
- ◊ Sketching the graph of a sine or cosine function: Problem type 3
- ◊ Amplitude and period of sine and cosine functions
- ◊ Amplitude, period, and phase shift of sine and cosine functions
- ◊ 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
- ◊ Word problem involving a sine or cosine function: Problem type 1
- ◊ Word problem involving a sine or cosine function: Problem type 2

♦ Graphs of Other Trigonometric Functions (5 topics)
- ◊ Matching graphs and equations for secant, cosecant, tangent, and cotangent functions
- ◊ 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

♦ Inverse Trigonometric Functions (5 topics)
- ◊ Values of inverse trigonometric functions
- ◊ Composition of a trigonometric function and an inverse trigonometric function: Problem type 1
- ◊ Composition of a trigonometric function and an inverse trigonometric function: Problem type 2
- ◊ Composition of a trigonometric function and an inverse trigonometric function: Problem type 3
- ◊ Composition of a trigonometric function and an inverse trigonometric function: Problem type 4

• Trigonometric Identities and Equations (28 topics)

♦ Verifying Trigonometric Identities (6 topics)
- ◊ Simplifying trigonometric expressions
- ◊ Using cofunction identities
- ◊ Verifying a trigonometric identity
- ◊ Proving trigonometric identities: Problem type 1
- ◊ Proving trigonometric identities: Problem type 2
- ◊ Proving trigonometric identities: Problem type 3

♦ Sum and Difference Formulas (4 topics)
- ◊ Sum and difference identities: Problem type 1
- ◊ Sum and difference identities: Problem type 2
- ◊ Sum and difference identities: Problem type 3
- ◊ Proving trigonometric identities using sum and difference properties

♦ Double−Angle, Half−Angle, and Product−to−Sum Formulas (6 topics)
- ◊ Double−angle identities: Problem type 1

- ◊ Double−angle identities: Problem type 2
- ◊ Half−angle identities: Problem type 1
- ◊ Product−to−sum and sum−to−product identities: Problem type 1
- ◊ Product−to−sum and sum−to−product identities: Problem type 2
- ◊ Proving trigonometric identities using double−angle properties

♦ Trigonometric Equations (12 topics)

- ◊ Finding solutions in an interval for a basic equation involving sine or cosine
- ◊ Finding solutions in an interval for a basic tangent, cotangent, secant, or cosecant equation
- ◊ Solving a basic trigonometric equation using a calculator
- ◊ Solving a basic trigonometric equation involving sine or cosine
- ◊ Solving a basic trigonometric equation involving tangent, cotangent, secant, or cosecant
- ◊ 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
- ◊ 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
- ◊ Finding solutions in an interval for a trigonometric equation with an angle multiplied by a constant

• Additional Topics in Trigonometry (5 topics)

♦ Laws of Sines and Cosines (5 topics)

- ◊ 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

