Trigonometry

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

Curriculum (426 topics + 501 additional topics)

- Algebra and Geometry Review (98 topics)
  - Real Numbers and Algebraic Expressions (14 topics)
    ◊ Signed fraction addition or subtraction: Basic
    ◊ Signed fraction subtraction involving double negation
    ◊ Signed fraction multiplication: Basic
    ◊ Signed fraction division
    ◊ Computing the distance between two integers on a number line
    ◊ Exponents and integers: Problem type 1
    ◊ Exponents and signed fractions
    ◊ Order of operations with integers
    ◊ 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 (9 topics)
    ◊ Introduction to the product rule of exponents
    ◊ Product rule with positive exponents: Univariate
    ◊ 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
    ◊ Simplifying a ratio of multivariate monomials: Basic
    ◊ Introduction to the quotient rule of exponents
    ◊ Simplifying a ratio of univariate monomials
  - Polynomial Expressions (8 topics)
    ◊ 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 binomials with leading coefficients of 1
    ◊ Multiplying binomials with leading coefficients greater than 1
    ◊ Multiplying conjugate binomials: Univariate
    ◊ Squaring a binomial: Univariate
    ◊ Multiplying binomials with negative coefficients
  - Factoring Polynomials (11 topics)
    ◊ Greatest common factor of 2 numbers
    ◊ Factoring a linear binomial
    ◊ Introduction to the GCF of two monomials
    ◊ Factoring out a monomial from a polynomial: Univariate
◊ Factoring a quadratic 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 perfect square trinomial with leading coefficient 1
◊ Factoring a difference of squares in one variable: Basic
◊ Factoring a difference of squares in one variable: Advanced

♦ Rational Expressions (28 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 polynomials by factoring a quadratic with leading coefficient 1
◊ Simplifying a ratio of polynomials: Problem type 1
◊ Multiplying rational expressions made up of linear expressions
◊ Multiplying rational expressions involving quadratics with leading coefficients of 1
◊ 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
◊ Writing equivalent rational expressions with polynomial denominators
◊ 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 linear denominators without common factors: Basic
◊ 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 made of sums involving rational expressions: Problem type 1

♦ Perfect Squares and nth Roots (6 topics)
◊ Finding all square roots of a number
◊ Square root of a rational perfect square
◊ Square roots of perfect squares with signs
◊ Introduction to solving an absolute value equation
◊ Cube root of an integer
◊ Finding nth roots of perfect nth powers with signs

♦ Rational Exponents (2 topics)
◊ Rational exponents: Unit fraction exponents and whole number bases
◊ Rational exponents: Non–unit fraction exponent with a whole number base

♦ Radical Expressions (15 topics)
◊ Simplifying the square root of a whole number less than 100
◊ Simplifying a higher root of a whole number
◊ Introduction to square root addition or subtraction
◊ Square root addition or subtraction
◊ Introduction to square root multiplication
◊ Square root multiplication: Basic
- **Square root multiplication:** Advanced
- 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
- 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

- **Geometry (5 topics)**
  - Area of a triangle
  - Circumference of a circle
  - Circumference and area of a circle
  - Introduction to the Pythagorean Theorem
  - Pythagorean Theorem

- **Equations and Inequalities (55 topics)**
  - **Linear Equations and Applications (19 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 two-step equation with signed fractions
    - 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
    - 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 one-step word problem using the formula \(d = rt\)
  - **Linear Inequalities and Applications (5 topics)**
    - Graphing a linear inequality on the number line
    - Graphing a compound inequality on the number line
    - Set-builder and interval notation
    - Solving a two-step linear inequality: Problem type 1
    - Solving a two-step linear inequality: Problem type 2
  - **Rational Equations that Simplify to Linear (5 topics)**
    - Solving a rational equation that simplifies to linear: Denominator \(x\)
    - Solving a rational equation that simplifies to linear: Denominator \(x+a\)
    - 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
    - Word problem on proportions: Problem type 1
  - **Complex Numbers (5 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

Quadratic Equations (13 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 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
- Applying the quadratic formula: Exact answers
- Applying the quadratic formula: Decimal answers
- 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 (1 topics)
- Restriction on a variable in a denominator: Quadratic

Radical Equations (7 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
- Algebraic symbol manipulation with radicals
- 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

Graphs and Functions (101 topics)
- The Coordinate Plane, Distance, and Midpoint (8 topics)
  - Reading a point in the coordinate plane
  - Plotting a point in the coordinate plane
  - Naming the quadrant or axis of a point given its coordinates
  - Naming the quadrant or axis of a point given the signs of its coordinates
  - Table for a linear equation
  - Distance between two points in the plane: Exact answers
  - Identifying solutions to a linear equation in two variables
  - Finding a solution to a linear equation in two variables

- Graphs of Equations (13 topics)
  - 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
  - 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 (9 topics)
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
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 \( Ax + By = C \)
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 of a line given the y−intercept and another point
Writing the equation of the line through two given points

♦ Linear Applications (3 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
  ◦ Finding the initial amount and rate of change given a graph of a linear function

♦ Systems of Equations (3 topics)
  ◦ Graphically solving a system of linear equations
  ◦ Using a graphing calculator to solve a system of linear equations: Basic
  ◦ Solving a system of linear equations using substitution

♦ Circles (2 topics)
  ◦ Identifying the center and radius to graph a circle given its equation in standard form
  ◦ Identifying the center and radius to graph a circle given its equation in general form: Basic

♦ Functions (18 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
  ◦ Variable expressions as inputs of functions: Problem type 1
  ◦ Variable expressions as inputs of functions: Problem type 2
  ◦ Variable expressions as inputs of functions: Problem type 3
  ◦ Domain and range from ordered pairs
  ◦ Domain of a rational function: Excluded values
  ◦ Domain of a rational function: Interval notation
  ◦ Domain of a square root function: Basic
  ◦ Domain of a square root 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

♦ Graphs of Functions (18 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 continuous 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
  ◦ Finding the absolute maximum and minimum of a function given the graph
  ◦ Finding values and intervals where the graph of a function is zero, positive, or negative
  ◦ 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−h)^2 + k
Graphing a square root function: Problem type 1
Graphing a square root function: Problem type 2
Matching parent graphs with their equations

Transformations (12 topics)
Translating the graph of a parabola: One step
Translating the graph of a parabola: Two steps
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
Transforming the graph of a quadratic, cubic, square root, or absolute value function
Writing an equation for a function after a vertical and horizontal translation

Combining Functions; Composite Functions; Inverse Functions (10 topics)
Introduction to the composition of two functions
Composition of two functions: Basic
Horizontal line test
Determining whether two functions are inverses of each other
Inverse functions: Linear, discrete
Inverse functions: Quadratic, square root
Inverse functions: Cubic, cube root
Inverse functions: Rational
Graphing the inverse of a function given its graph
Finding, evaluating, and interpreting an inverse function for a given linear relationship

Quadratic Functions (5 topics)
Graphing a parabola of the form y = x^2 + bx + c
Graphing a parabola of the form y = a(x−h)^2 + k
Graphing a parabola of the form y = ax^2 + bx + c: Integer coefficients
Finding the maximum or minimum of a quadratic function
Word problem involving the maximum or minimum of a quadratic function

Trigonometric Functions (36 topics)
Angles and Their Measure (9 topics)
Converting degrees–minutes–seconds to decimal degrees
Converting a decimal degree to degrees–minutes–seconds
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
Area of a sector of a circle
Angular and linear speed
The Unit Circle and Evaluating Trigonometric Functions (10 topics)
Finding coordinates on the unit circle for special angles
Finding a point on the unit circle given one coordinate
Trigonometric functions and special angles: Problem type 1
Finding trigonometric ratios from a point on the unit circle

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Trigonometric functions and special angles: Problem type 2
Trigonometric functions and special angles: Problem type 3
Evaluating expressions involving sine and cosine
Even and odd properties of trigonometric functions
Using a calculator to approximate sine, cosine, and tangent values
Evaluating a sinusoidal function that models a real-world situation

Right Triangle Trigonometry (10 topics)
Special right triangles: Exact answers
Sine, cosine, and tangent ratios: Variables for side lengths
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 a length in a word problem with one right triangle
Using a trigonometric ratio to find an angle measure in a right triangle
Using trigonometry to find angles of elevation or depression in a word problem
Solving a right triangle
Using trigonometry to find a length in a word problem with two right triangles

Trigonometric Functions of Angles (7 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
Finding values of trigonometric functions given information about an angle: Problem type 4

Trigonometric Graphs (20 topics)
Graphs of Sine and Cosine Functions (14 topics)
Sketching the graph of $y = a \sin(x)$ or $y = a \cos(x)$
Sketching the graph of $y = \sin(bx)$ or $y = \cos(bx)$
Sketching the graph of $y = \sin(x) + d$ or $y = \cos(x) + d$
Sketching the graph of $y = \sin(x+c)$ or $y = \cos(x+c)$
Sketching the graph of $y = a \sin(x+c)$ or $y = a \cos(x+c)$
Sketching the graph of $y = a \sin(bx)$ or $y = a \cos(bx)$
Sketching the graph of $y = a \sin(bx+c)$ or $y = a \cos(bx+c)$
Sketching the graph of $y = a \sin(bx+d)$ or $y = a \cos(bx+d)$
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 (6 topics)
Domains and ranges of trigonometric functions
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

Trigonometric Identities and Equations (47 topics)
Inverse Trigonometric Functions (9 topics)
Values of inverse trigonometric functions
Composition of a trigonometric function with its inverse trigonometric function: Problem type 1
Composition of a trigonometric function with its inverse trigonometric function: Problem type 2
Composition of a trigonometric function with the inverse of another trigonometric function:
- Problem type 1
- Problem type 2
- Problem type 3
Composition of trigonometric functions with variable expressions as inputs:
- Problem type 1
- Problem type 2
Using a calculator to approximate inverse trigonometric values

Verifying Trigonometric Identities (7 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
- Proving trigonometric identities using odd and even properties

Sum and Difference Formulas (6 topics)
- Sum and difference identities: Problem type 1
- Sum and difference identities: Problem type 2
- Sum and difference identities: Problem type 3
- Sum and difference identities: Problem type 4
- Proving trigonometric identities using sum and difference properties: Problem type 1
- Proving trigonometric identities using sum and difference properties: Problem type 2

Double–Angle, Half–Angle, and Product–to–Sum Formulas (8 topics)
- Double–angle identities: Problem type 1
- Double–angle identities: Problem type 2
- Power–reducing identities
- Half–angle identities: Problem type 1
- Half–angle identities: Problem type 2
- 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 (17 topics)
- Finding solutions in an interval for a basic equation involving sine or cosine
- Finding solutions in an interval for a basic equation involving tangent, cotangent, secant, or cosecant
- 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: Problem type 1
- 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
- Using a graphing calculator to solve a trigonometric equation
- Solving a trigonometric equation involving a squared function: Problem type 1
- Solving a trigonometric equation involving a squared function: Problem type 2
- Solving a trigonometric equation involving an angle multiplied by a constant
- Finding solutions in an interval for a trigonometric equation with an angle multiplied by a constant
- Finding solutions in an interval for an equation with sine and cosine using sum and difference identities
• Triangles and Vectors (34 topics)
  ◆ Laws of Sines and Cosines (8 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
    ◆ Using trigonometry to find the area of a right triangle
    ◆ Finding the area of a triangle using trigonometry
    ◆ Heron's formula
  ◆ Vectors (19 topics)
    ◆ Writing a position vector in ai+bj form given its graph
    ◆ Writing a vector in ai+bj form given its initial and terminal points
    ◆ Writing a vector in component form given its initial and terminal points
    ◆ Magnitude of a vector given in ai+bj form
    ◆ Magnitude of a vector given in component form
    ◆ Vector addition and scalar multiplication: ai+bj form
    ◆ Linear combination of vectors: ai+bj form
    ◆ Vector addition and scalar multiplication: Component form
    ◆ Linear combination of vectors: Component form
    ◆ Unit vectors
    ◆ Multiplication of a vector by a scalar: Geometric approach
    ◆ Vector addition: Geometric approach
    ◆ Vector subtraction: Geometric approach
    ◆ Finding the magnitude and direction of a vector given its graph
    ◆ Finding the components of a vector given its graph
    ◆ Finding the direction angle of a vector given in ai+bj form
    ◆ Writing a vector given its magnitude and direction angle
    ◆ Writing a vector to represent a force pushing or pulling an object
    ◆ Finding the magnitude and direction angle of the resultant force of two vectors
  ◆ The Dot Product (7 topics)
    ◆ Dot product of vectors given in ai+bj form
    ◆ Dot product of vectors given in component form
    ◆ Finding the angle between two vectors given in component form
    ◆ Classifying vector relationships by finding the angle between two vectors given in ai + bj form
    ◆ Decomposing a vector into two orthogonal vectors
    ◆ Finding the amount of work done given a force vector and a distance
    ◆ Finding magnitudes of forces related to an object on a ramp
• Polar Coordinates and Complex Numbers (22 topics)
  ◆ Polar Coordinates and Equations (7 topics)
    ◆ Plotting points in polar coordinates
    ◆ Multiple representations of polar coordinates
    ◆ Converting rectangular coordinates to polar coordinates: Special angles
    ◆ Converting polar coordinates to rectangular coordinates
    ◆ Converting an equation written in rectangular form to one written in polar form
    ◆ Converting an equation written in polar form to one written in rectangular form: Problem type 1
    ◆ Converting an equation written in polar form to one written in rectangular form: Problem type 2
  ◆ Graphs of Polar Equations (6 topics)
    ◆ Graphing a polar equation: Basic
    ◆ Graphing a polar equation: Circle
    ◆ Graphing a polar equation: Limacon
    ◆ Graphing a polar equation: Rose
    ◆ Graphing a polar equation: Lemniscate
Matching polar equations with their graphs

Complex Numbers and De Moivre’s Theorem (9 topics)
- Plotting complex numbers
- Writing a complex number in standard form given its trigonometric form
- Writing a complex number in trigonometric form: Special angles
- Writing a complex number in trigonometric form: Decimal answers
- Multiplying and dividing complex numbers in trigonometric form
- De Moivre’s Theorem: Answers in trigonometric form
- De Moivre’s Theorem: Answers in standard form
- Finding the nth roots of a number: Problem type 1
- Finding the nth roots of a number: Problem type 2

Conic Sections (13 topics)
- Parabolas (2 topics)
  - Graphing a parabola of the form \( y^2 = ax \) or \( x^2 = ay \)
  - Graphing a parabola of the form \( x = a(y-k)^2 + h \) or \( y = a(x-h)^2 + k \)
- Ellipses (1 topic)
  - Graphing an ellipse given its equation in standard form
- Parametric Equations (10 topics)
  - Completing a table and choosing a graph given a pair of parametric equations
  - Writing the equation of a line and sketching its graph given its parametric equations
  - Writing the equation of a parabola and sketching its graph given its parametric equations
  - Writing the equation of a circle or ellipse and sketching its graph given its parametric equations
  - Graphing a pair of parametric equations with a restricted domain: Line or parabola
  - Graphing a pair of parametric equations with a restricted domain: Circle
  - Graphing a pair of parametric equations with a restricted domain: Ellipse
  - Completing pairs of parametric equations
  - Word problem involving parametric equations for projectile motion: Problem type 1
  - Word problem involving parametric equations for projectile motion: Problem type 2

Other Topics Available(*) (501 additional topics)
- Algebra and Geometry Review (182 topics)
  - Fractional position on a number line
  - Plotting rational numbers on a number line
  - Ordering integers
  - Estimating a square root
  - Ordering real numbers
  - Identifying numbers as integers or non-integers
  - Identifying numbers as rational or irrational
  - Signed fraction addition or subtraction: Advanced
  - Addition and subtraction of 3 fractions involving signs
  - Signed fraction multiplication: Advanced
  - Operations with absolute value: Problem type 2
  - Exponents and integers: Problem type 2
  - Order of operations with integers and exponents
  - Converting between temperatures in Fahrenheit and Celsius
  - Properties of addition
  - Properties of real numbers
  - Identifying properties used to simplify an algebraic expression
  - Understanding the product rule of exponents
  - Product rule with positive exponents: Multivariate
  - Understanding the power rules of exponents
  - Power and product rules with positive exponents
◊ 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
◊ Scientific notation with positive exponent
◊ Scientific notation with negative exponent
◊ Converting between scientific notation and standard form in a real-world situation
◊ Multiplying numbers written in scientific notation: Basic
◊ Multiplying numbers written in scientific notation: Advanced
◊ Multiplying numbers written in decimal form or scientific notation in a real-world situation
◊ Dividing numbers written in scientific notation: Basic
◊ Dividing numbers written in scientific notation: Advanced
◊ Finding the scale factor between numbers given in scientific notation in a real-world situation
◊ Degree and leading coefficient of a univariate polynomial
◊ Degree of a multivariate polynomial
◊ Simplifying a sum or difference of three univariate polynomials
◊ Simplifying a sum or difference of multivariate polynomials
◊ Multiplying a multivariate polynomial by a monomial
◊ Multiplying binomials in two variables
◊ Multiplying conjugate binomials: Multivariate
◊ Squaring a binomial: Multivariate
◊ Multiplication involving binomials and trinomials in one variable
◊ Multiplication involving binomials and trinomials in two variables
◊ Prime numbers
◊ Prime factorization
◊ Greatest common factor of three univariate monomials
◊ Greatest common factor of two multivariate monomials
◊ Factoring out a monomial from a polynomial: Multivariate
◊ Factoring out a binomial from a polynomial: GCF factoring, 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 multivariate polynomial by grouping: Problem type 2
◊ Factoring a quadratic in two variables with leading coefficient 1
◊ Factoring a quadratic with leading coefficient greater than 1: Problem type 3
◊ Factoring a quadratic by the ac-method
◊ 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 greater than 1
◊ Factoring a perfect square trinomial in two variables
◊ Factoring a difference of squares in two variables
◊ Factoring a polynomial involving a GCF and a difference of squares: Univariate
◊ Factoring a polynomial involving a GCF and a difference of squares: Multivariate
◊ 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 binomials from a polynomial: GCF factoring, advanced
◊ Using substitution to factor polynomials
◊ Simplifying a ratio of factored polynomials: Factors with exponents
◊ Simplifying a ratio of linear polynomials: 1, −1, and no simplification
◊ Simplifying a ratio of polynomials: Problem type 2
◊ Simplifying a ratio of polynomials: Problem type 3
◊ Simplifying a ratio of multivariate polynomials
◊ Multiplying rational expressions involving multivariate monomials
◊ Multiplying rational expressions involving quadratics with leading coefficients greater than 1
◊ Multiplying rational expressions involving multivariate quadratics
◊ Dividing rational expressions involving multivariate monomials
◊ Dividing rational expressions involving quadratics with leading coefficients greater than 1
◊ Dividing rational expressions involving multivariate quadratics
◊ Multiplication and division of 3 rational expressions
◊ Least common multiple of two monomials
◊ Finding the LCD of rational expressions with linear denominators: Common factors
◊ Finding the LCD of rational expressions with quadratic denominators
◊ Writing equivalent rational expressions with monomial denominators
◊ Writing equivalent rational expressions involving opposite factors
◊ Adding rational expressions with denominators $ax^n$ and $bx^m$
◊ Adding rational expressions with multivariate monomial denominators: Basic
◊ Adding rational expressions with multivariate monomial denominators: Advanced
◊ Adding rational expressions with linear denominators without common factors: Advanced
◊ Adding rational expressions with linear denominators with common factors: Basic
◊ Adding rational expressions with linear denominators with common factors: Advanced
◊ Adding rational expressions with denominators $ax−b$ and $b−ax$
◊ Adding rational expressions involving different quadratic denominators
◊ Adding 3 rational expressions with different quadratic denominators
◊ Complex fraction involving multivariate monomials
◊ Complex fraction: Quadratic factoring
◊ 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
◊ Complex fraction made of sums involving rational expressions: Problem type 5
◊ Complex fraction made of sums involving rational expressions: Problem type 6
◊ 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
◊ Using absolute value to simplify square roots of perfect square monomials
◊ Finding the $n^{th}$ root of a perfect $n^{th}$ power fraction
◊ Finding the $n^{th}$ root of a perfect $n^{th}$ power monomial
◊ Using absolute value to simplify higher radical expressions
◊ Converting between radical form and exponent form
◊ Rational exponents: Unit fraction exponents and bases involving signs
◊ Rational exponents: Negative exponents and fractional bases
◊ Rational exponents: Product rule
◊ Rational exponents: Quotient rule
Rational exponents: Products and quotients with negative exponents
Rational exponents: Power of a power rule
Rational exponents: Powers of powers with negative exponents
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
Introduction to simplifying a higher radical expression
Simplifying a higher radical expression: Univariate
Simplifying a higher radical expression: Multivariate
Square root addition or subtraction with three terms
Introduction to simplifying a sum or difference of radical expressions: Univariate
Simplifying a sum or difference of radical expressions: Univariate
Simplifying a sum or difference of radical expressions: Multivariate
Simplifying a sum or difference of higher roots
Simplifying a sum or difference of higher radical expressions
Introduction to simplifying a product of radical expressions: Univariate
Simplifying a product of radical expressions: Univariate
Simplifying a product of radical expressions: Multivariate
Simplifying a product of radical expressions: Multivariate, fractional expressions
Introduction to simplifying a product of higher roots
Simplifying a product of higher radical expressions
Special products of radical expressions: Conjugates and squaring
Classifying sums and products as rational or irrational
Rationalizing a denominator: Quotient involving a monomial
Rationalizing a denominator using conjugates: Square root in numerator
Rationalizing a denominator using conjugates: Variable in denominator
Rationalizing a denominator: Quotient involving a higher radical
Rationalizing a denominator: Quotient involving higher radicals and monomials
Simplifying products or quotients of higher radicals with different indices: Univariate
Simplifying products or quotients of higher radicals with different indices: Multivariate
Area of a piecewise rectangular figure
Word problem involving the area between two rectangles
Area of a parallelogram
Area of a trapezoid
Perimeter involving rectangles and circles
Circumference and area of a circle: Exact answers in terms of pi
Area involving rectangles and circles
Word problem involving the area between two concentric circles
Area involving inscribed figures
Volume of a rectangular prism
Volume of a triangular prism
Volume of a pyramid
Volume of a cylinder
Word problem involving the rate of filling or emptying a cylinder
Volume of a cone
Volume of a cone: Exact answers in terms of pi
Volume of a sphere
Surface area of a cube or a rectangular prism
Surface area of a triangular prism
Surface area of a cylinder
Surface area of a cylinder: Exact answers in terms of pi
- Surface area of a sphere
- Word problem involving the Pythagorean Theorem

### Equations and Inequalities (100 topics)

- Identifying properties used to solve a linear equation
- Solving a linear equation with several occurrences of the variable: Fractional forms with monomial numerators
- 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
- Translating a sentence into a multi-step equation
- 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 word problem involving consecutive integers
- Writing a multi-step equation for a real-world situation
- Solving a value mixture problem using a linear equation
- Solving a distance, rate, time problem using a linear equation
- Finding the perimeter or area of a rectangle given one of these values
- Circumference ratios
- Finding angle measures of a triangle given angles with variables
- 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
- Finding the total cost including tax or markup
- Finding the original price given the sale price and percent discount
- Computing a percent mixture
- Solving a percent mixture problem using a linear equation
- Finding simple interest without a calculator
- 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
- Solving an absolute value equation of the form $|ax+b| = |cx+d|
- Translating a sentence into a one-step inequality
- Translating a sentence into a multi-step inequality
- Writing an inequality for a real-world situation
- Writing an inequality given a graph on the number line
- Translating a sentence into a compound inequality
- Writing a compound inequality given a graph on the number line
- Set-builder 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 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 inequalities with no solution or all real numbers as solutions
- 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
Solving an absolute value inequality: Problem type 1
Writing an absolute value inequality given a graph on the number line
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
Solving a proportion of the form \( \frac{a}{x+b} = \frac{c}{x} \)
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 3
Word problem on proportions: Problem type 2
Similar polygons
Similar right triangles
Indirect measurement
Word problem involving multiple rates
Solving a work problem using a rational equation
Solving a distance, rate, time problem using a rational equation
Simplifying a power of \( i \)
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
Using the Pythagorean Theorem and a quadratic equation to find side lengths of a right triangle
Solving a quadratic equation by completing the square: Exact answers
Solving a quadratic equation with complex roots
Discriminant of a quadratic equation
Discriminant of a quadratic equation with parameter
Solving a quadratic inequality written in factored form
Solving a quadratic inequality
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
Solving a rational equation that simplifies to quadratic: Factorable quadratic denominator
Solving a radical equation that simplifies to a quadratic equation: Proportional form, advanced
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 with a quadratic expression under the radical
Solving a radical equation with two radicals that simplifies to \( \sqrt{x} = a \)
Solving a radical equation that simplifies to a quadratic equation: Two radicals
Word problem involving radical equations: Basic
Word problem involving radical equations: Advanced
Solving an equation with exponent \( \frac{1}{a} \): Problem type 1
Solving an equation with exponent \( \frac{1}{a} \): Problem type 2
Solving an equation with positive rational exponent
Solving an equation with negative rational exponent
Solving an equation that can be written in quadratic form: Problem type 1
Solving an equation that can be written in quadratic form: Problem type 2
Graphs and Functions (111 topics)

- Finding the area of a triangle or parallelogram in the coordinate plane
- Distance between two points in the plane: Decimal answers
- Identifying scalene, isosceles, and equilateral triangles given coordinates of their vertices
- Midpoint of a line segment in the plane
- Finding an endpoint of a line segment given the other endpoint and the midpoint
- Finding x− and y−intercepts of a line given the equation: Advanced
- Graphing a line given its x− and y−intercepts
- Finding x− and y−intercepts of the graph of a nonlinear equation
- Determining if graphs have symmetry with respect to the x−axis, y−axis, or origin
- Testing an equation for symmetry about the axes and origin
- Classifying slopes given graphs of lines
- Finding the coordinate that yields a given slope
- Graphing a line given its slope and y−intercept
- Graphing a line through a given point with a given slope
- Identifying linear equations: Advanced
- Identifying linear functions given ordered pairs
- Rewriting a linear equation in the form Ax + By = C
- Graphing a line by first finding its slope and y−intercept
- Writing an equation and graphing a line given its slope and y−intercept
- Finding the slope, y−intercept, and equation for a linear function given a table of values
- Finding the slope and a point on a line given its equation in point−slope form
- Graphing a line given its equation in point−slope form
- Writing an equation in point−slope form given the slope and a point
- Writing an equation in standard form given the slope and a point
- Writing the equations of vertical and horizontal lines through a given point
- Comparing linear functions to the parent function y=x
- 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
- Identifying parallel and perpendicular lines from coordinates
- Identifying coordinates that give right triangles
- Graphing ordered pairs and writing an equation from a table of values in context
- Finding the initial amount and rate of change given a table for a linear function
- Combining functions to write a new function that models a real−world situation
- Comparing properties of linear functions given in different forms
- 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
- Identifying solutions to a system of linear equations
- Using a graphing calculator to solve a system of linear equations: Advanced
- Writing a system of linear equations given its graph
- Solving a system of linear equations using elimination with addition
- 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
- Identifying the center and radius to graph a circle given its equation in general form: Advanced
- Writing the equation of a circle centered at the origin given its radius or a point on the circle
- Writing an equation of a circle and identifying points that lie on the circle
- Writing an equation of a circle given its center and radius or diameter
- Deriving the equation of a circle using the Pythagorean Theorem
- 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
◊ Evaluating a cube root function
◊ Evaluating functions: Absolute value, rational, radical
◊ Table for an exponential function
◊ Evaluating a piecewise-defined function
◊ Domains of higher root functions
◊ 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
◊ Domain and range of a linear function that models a real-world situation
◊ Rewriting a multivariate function as a univariate function given a relationship between its variables
◊ Finding a difference quotient for a linear or quadratic function
◊ Finding a difference quotient for a rational function
◊ Domain and range from the graph of a discrete relation
◊ Finding domain and range from a linear graph in context
◊ Domain and range from the graph of a piecewise function
◊ Choosing a graph to fit a narrative: Basic
◊ Choosing a graph to fit a narrative: Advanced
◊ Graphing an integer function and finding its range for a given domain
◊ Graphing a square root function: Problem type 3
◊ Graphing a cube root function
◊ Graphing an exponential function and its asymptote: f(x)=b^x
◊ Graphing a piecewise-defined function: Problem type 1
◊ Graphing a piecewise-defined function: Problem type 2
◊ Graphing a piecewise-defined function: Problem type 3
◊ Even and odd functions: Problem type 1
◊ Even and odd functions: Problem type 2
◊ Finding the average rate of change of a function
◊ Finding the average rate of change of a function given its graph
◊ Word problem involving average rate of change
◊ Writing the equation of a secant line
◊ How the leading coefficient affects the shape of a parabola
◊ How the leading coefficient affects the graph of an absolute value function
◊ Sum, difference, and product of two functions
◊ Quotient of two functions: Basic
◊ Quotient of two functions: Advanced
◊ Combining functions: Advanced
◊ Composition of a function with itself
◊ Expressing a function as a composition of two functions
◊ Composition of two functions: Domain and range
◊ Composition of two functions: Advanced
◊ Composition of two rational functions
◊ Word problem involving composition of two functions
◊ Finding the vertex, intercepts, and axis of symmetry from the graph of a parabola
◊ Graphing a parabola of the form y = ax^2 + bx + c: Rational coefficients
◊ Finding the zeros of a quadratic function given its equation
◊ Using a graphing calculator to find the zeros of a quadratic function
◊ Writing a quadratic function given its zeros
◊ 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 in standard form
◊ Rewriting a quadratic function to find its vertex and sketch its graph
◊ Word problem involving optimizing area by using a quadratic function
Domain and range from the graph of a quadratic function
♦ Range of a quadratic function
♦ Writing the equation of a quadratic function given its graph
♦ Finding zeros of a polynomial function written in factored form
♦ Finding x- and y-intercepts given a polynomial function
♦ Using a graphing calculator to find local extrema of a polynomial function
♦ Using a graphing calculator to find zeros of a polynomial function

Trigonometric Functions (5 topics)
♦ Using a calculator to approximate cosecant, secant, and cotangent values
♦ Sine, cosine, and tangent ratios: Numbers for side lengths
♦ Understanding trigonometric ratios through similar right triangles
♦ Relationship between the sines and cosines of complementary angles
♦ Using similar right triangles to find trigonometric ratios

Trigonometric Graphs (1 topic)
♦ Sketching a graph of a damped sine or cosine function

Trigonometric Identities and Equations (9 topics)
♦ Proving trigonometric identities: Problem type 4
♦ Double-angle identities: Problem type 3
♦ Proving trigonometric identities using sum-to-product formulas
♦ Finding solutions in an interval for a trigonometric equation using Pythagorean identities: Problem type 2
♦ Using a graphing calculator to solve a trigonometric inequality
♦ Solving a trigonometric equation involving more than one function
♦ Solving a trigonometric equation using sum and difference identities
♦ Solving a trigonometric equation using double-angle identities
♦ Solving a trigonometric equation using half-angle identities

Triangles and Vectors (7 topics)
♦ Proving the law of sines
♦ Proving the law of cosines
♦ Expressing the area of a triangle in terms of the sine of one of its angles
♦ Finding magnitudes of forces related to a sum of three vectors
♦ Finding magnitudes of forces related to an object suspended by cables
♦ Using the dot product to find perpendicular vectors
♦ Finding the component of a vector along another vector

Polar Coordinates and Complex Numbers (2 topics)
♦ Converting rectangular coordinates to polar coordinates: Decimal answers
♦ Identifying symmetries of graphs given their polar equations

Conic Sections (24 topics)
♦ Graphing a parabola of the form ay² + by + cx + d = 0 or ax² + bx + cy + d = 0
♦ Writing an equation of a parabola given the vertex and the focus
♦ Writing an equation of a parabola given the focus and the directrix
♦ Deriving the equation of a parabola given its focus and directrix
♦ Finding the vertex, focus, directrix, and axis of symmetry of a parabola
♦ Finding the focus of a parabola of the form ay² + by + cx + d = 0 or ax² + bx + cy + d = 0
♦ Writing an equation of a parabola given its graph
♦ Word problem involving a parabola
♦ Graphing an ellipse centered at the origin: Ax² + By² = C
♦ Graphing an ellipse given its equation in general form
♦ Finding the center, vertices, and foci of an ellipse
♦ Finding the foci of an ellipse given its equation in general form
♦ Writing an equation of an ellipse given the center, an endpoint of an axis, and the length of the other axis
♦ Writing an equation of an ellipse given the foci and the major axis length
◊ Word problem involving an ellipse
◊ Graphing a hyperbola given its equation in standard form
◊ Graphing a hyperbola centered at the origin: \( Ax^2 + By^2 = C \)
◊ Graphing a hyperbola given its equation in general form
◊ Finding the center, vertices, foci, and asymptotes of a hyperbola
◊ Finding the foci of a hyperbola given its equation in general form
◊ Writing an equation of a hyperbola given the foci and the vertices
◊ Writing an equation of a hyperbola given the foci and the asymptotes: Basic
◊ Writing an equation of a hyperbola given the foci and the asymptotes: Advanced
◊ Classifying conics given their equations

♦ Exponential and Logarithmic Functions (60 topics)
◊ Graphing an exponential function and its asymptote: \( f(x) = a(b)^x \)
◊ Graphing an exponential function and its asymptote: \( f(x) = b^{-x} \) or \( f(x) = -b^{ax} \)
◊ Translating the graph of an exponential function
◊ Finding domain and range from the graph of an exponential function
◊ The graph, domain, and range of an exponential function
◊ Transforming the graph of a natural exponential function
◊ Graphing an exponential function and its asymptote: \( f(x) = a(e)^{x-b} + c \)
◊ Using a calculator to evaluate exponential expressions
◊ Evaluating an exponential function that models a real–world situation
◊ Using a calculator to evaluate exponential expressions involving base e
◊ Evaluating an exponential function with base e that models a real–world situation
◊ Introduction to compound interest
◊ Calculating and comparing simple interest and compound interest
◊ Finding a final amount in a word problem on exponential growth or decay
◊ Finding the final amount in a word problem on compound interest
◊ Finding the initial amount and rate of change given an exponential function
◊ Writing an equation that models exponential growth or decay
◊ Writing an exponential function rule given a table of ordered pairs
◊ Comparing linear, polynomial, and exponential functions
◊ Using a calculator to evaluate natural and common logarithmic expressions
◊ Converting between logarithmic and exponential equations
◊ Converting between natural logarithmic and exponential equations
◊ Evaluating logarithmic expressions
◊ 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
◊ Domain of a logarithmic function: Advanced
◊ Graphing a logarithmic function: Advanced
◊ Basic properties of logarithms
◊ Using properties of logarithms to evaluate expressions
◊ Expanding a logarithmic expression: Problem type 1
◊ Expanding a logarithmic expression: Problem type 2
◊ Expanding a logarithmic expression: Problem type 3
◊ Writing an expression as a single logarithm
◊ Change of base for logarithms: Problem type 1
◊ Change of base for logarithms: Problem type 2
◊ Solving a multi–step equation involving a single logarithm: Problem type 1
◊ Solving a multi–step equation involving a single logarithm: Problem type 2
◊ 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, basic
◊ Solving an exponential equation by using natural logarithms: Decimal answers
◊ Solving an exponential equation by using logarithms: Decimal answers, advanced
◊ Solving an exponential equation by using logarithms: Exact answers in logarithmic form
◊ Solving an exponential equation by using substitution and quadratic factoring
◊ Using a graphing calculator to solve an exponential or logarithmic equation
◊ Finding the time to reach a limit in a word problem on exponential growth or decay
◊ Finding the time in a word problem on compound interest
◊ Finding the time given an exponential function with base e that models a real−world situation
◊ Finding the final amount in a word problem on continuous compound interest
◊ Finding the final amount in a word problem on continuous exponential growth or decay
◊ Finding the initial amount in a word problem on continuous exponential growth or decay
◊ Finding the rate or time in a word problem on continuous exponential growth or decay
◊ Finding half−life or doubling time
◊ Writing and evaluating a function modeling continuous exponential growth or decay given doubling time or half−life
◊ Writing and evaluating a function modeling continuous exponential growth or decay given two outputs

*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.