**Precalculus**

**Khan Academy Video Correlations  
By SpringBoard Activity**

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| **SB Activity** | **Video(s)** |
| **Unit 1: Sequences, Series, Exponential and Logarithmic Functions** | |
| **Activity 1**  *Arithmetic Sequences*  1-1 Learning Targets:   * Write an expression for a sequence. * Use subscript notation.   1-2 Learning Targets:   * Use sigma notation to represent a series. * Write the algebraic form of an arithmetic sequence. * Calculate the nth term or nth partial sum of an arithmetic series.   1-3 Learning Targets:   * Understand the method of mathematical induction. * Use mathematical induction to prove statements. | ***Sequences and Subscript Notation*** |
| [**Arithmetic sequences**](http://www.khanacademy.org/math/precalculus/seq_induction/seq_and_series/v/arithmetic-sequences)  [**Finding the 100th term in a sequence**](http://www.khanacademy.org/math/precalculus/seq_induction/seq_and_series/v/finding-the-100th-term-in-a-sequence)  [**Equations of sequence patterns**](http://www.khanacademy.org/math/precalculus/seq_induction/seq_and_series/v/equations-of-sequence-patterns) |
| ***Sigma Notation*** |
| [**Sigma notation for sums**](http://www.khanacademy.org/math/precalculus/seq_induction/geometric-sequence-series/v/sigma-notation-sum) |
| ***Mathematical Induction*** |
| [**Proof by induction**](http://www.khanacademy.org/math/precalculus/seq_induction/proof_by_induction/v/proof-by-induction)  [**Alternate proof to induction for integer sum**](http://www.khanacademy.org/math/precalculus/seq_induction/proof_by_induction/v/alternate-proof-to-induction-for-integer-sum) |
| **Activity 2**  *Geometric Sequences*  2-1 Learning Targets:   * Identify a geometric sequence. * Determine the common ratio of a geometric sequence.   1. Learning Targets: * Write the algebraic form of a geometric sequence. * Calculate the sum of a finite geometric series.   2-3 Learning Targets:   * Determine if a sequence converges or diverges. * Find the sum of an infinite geometric series. | ***Identifying Geometric Sequences*** |
| [**Geometric sequences introduction**](http://www.khanacademy.org/math/precalculus/seq_induction/precalc-geometric-sequences/v/geometric-sequences-introduction)  [**Geometric sequences**](http://www.khanacademy.org/math/precalculus/seq_induction/precalc-geometric-sequences/v/geometric-sequences) |
| ***Finite Geometric Sequences and Series*** |
| [**Geometric series**](http://www.khanacademy.org/math/precalculus/seq_induction/geometric-sequence-series/v/geometric-series-introduction)  [**Formula for a finite geometric series**](http://www.khanacademy.org/math/precalculus/seq_induction/geometric-sequence-series/v/geometric-series)  [**Series as sum of sequence**](http://www.khanacademy.org/math/precalculus/seq_induction/seq_and_series/v/series-as-sum-of-sequence)  [**Constructing a geometric series for new users**](http://www.khanacademy.org/math/precalculus/seq_induction/geometric-sequence-series/v/geometric-series-word-problem)  [**Geometric series sum to figure out mortgage payments**](http://www.khanacademy.org/math/precalculus/seq_induction/geometric-sequence-series/v/geometric-series-sum-to-figure-out-mortgage-payments) |
| ***Infinite Geometric Sequences and Series*** |
| [**Sum of an infinite geometric series**](http://www.khanacademy.org/math/precalculus/seq_induction/infinite-geometric-series/v/infinite-geometric-series)  [**Another derivation of the sum of an infinite geometric series**](http://www.khanacademy.org/math/precalculus/seq_induction/infinite-geometric-series/v/deriving-geometric-series-sum-formula)  [**Geometric series convergence and divergence examples**](http://www.khanacademy.org/math/precalculus/seq_induction/infinite-geometric-series/v/geometric-series-convergence-divergence)  [**Repeating decimal as infinite geometric series**](http://www.khanacademy.org/math/precalculus/seq_induction/infinite-geometric-series/v/repeating-decimal-geometric-series)  [**Vertical distance of bouncing ball**](http://www.khanacademy.org/math/precalculus/seq_induction/infinite-geometric-series/v/bouncing-ball-distance) |
| **Activity 3**  *Modeling Recursive Relationships*  3-1 Learning Targets:   * Represent arithmetic and geometric sequences recursively. * Determine the explicit form of a recursive sequence.   3-2 Learning Targets:   * Represent arithmetic and geometric sequences recursively. * Determine the explicit form of a recursive sequence. | ***Explicit and Recursive Formulas*** |
| [***Explicit and recursive definitions of sequences***](http://www.khanacademy.org/math/precalculus/seq_induction/seq_and_series/v/explicit-and-recursive-definitions-of-sequences)  [***Converting an explicit function to a recursive function***](http://www.khanacademy.org/math/precalculus/seq_induction/recursive-functions/v/converting-an-explicit-function-to-a-recursive-function) |
| **Activity 4**  *Exponential Functions*  4-1 Learning Targets:   * Write, graph, analyze, and model with exponential functions. * Solve exponential equations.   4-2 Learning Targets:   * Write, graph, analyze, and model with exponential functions. * Calculate compound interest. * Solve exponential equations.   4-3 Learning Targets:   * Write, graph, analyze, and model with exponential functions. * Calculate compound interest. * Solve exponential equations. | ***Exponential Functions and Equations*** |
| [**Exponential growth functions**](https://www.khanacademy.org/math/algebra2/exponential_and_logarithmic_func/exp_growth_decay/v/exponential-growth-functions)  [**Graphing exponential functions**](https://www.khanacademy.org/math/algebra2/exponential_and_logarithmic_func/exp_growth_decay/v/graphing-exponential-functions)  [**Solving exponential equation**](https://www.khanacademy.org/math/algebra2/exponential_and_logarithmic_func/exponential-modeling/v/solve-exponentials) |
| ***Modeling with Exponential Functions*** |
| [**Exponential growth and decay word problems**](https://www.khanacademy.org/math/algebra2/exponential_and_logarithmic_func/exponential-modeling/v/word-problem-solving-exponential-growth-and-decay)  [**Decay of cesium 137 example**](https://www.khanacademy.org/math/algebra2/exponential_and_logarithmic_func/exponential-modeling/v/decay-of-cesium-137-example)  [**Modeling ticket fines with exponential function**](https://www.khanacademy.org/math/algebra2/exponential_and_logarithmic_func/exponential-modeling/v/modeling-ticket-fines-with-exponential-function) |
| ***Compound Interest*** |
| [**Introduction to compound interest and e**](https://www.khanacademy.org/math/algebra2/exponential_and_logarithmic_func/continuous_compounding/v/introduction-to-compound-interest-and-e)  [**Compound interest and e (part 2)**](http://www.khanacademy.org/math/algebra2/exponential_and_logarithmic_func/continuous_compounding/v/compound-interest-and-e-part-2)  [**Compound interest and e (part 3)**](http://www.khanacademy.org/math/algebra2/exponential_and_logarithmic_func/continuous_compounding/v/compound-interest-and-e-part-3)  [**Compound interest and e (part 4)**](http://www.khanacademy.org/math/algebra2/exponential_and_logarithmic_func/continuous_compounding/v/compound-interest-and-e-part-4) |
| **Activity 5**  *Logarithms*  5-1 Learning Targets:   * Explore the inverse relationship between exponents and logarithms. * Graph logarithmic functions and analyze key features of the graphs.   5-2 Learning Targets:   * Apply the Change of Base Formula. * Use properties of logarithms to evaluate and transform expressions.   5-3 Learning Targets:   * Solve exponential equations by taking the logarithm of both sides. * Use properties of exponents and logarithms to solve logarithmic equations. | ***Common and Natural Logarithms*** |
| [**Comparing exponential and logarithmic functions**](https://www.khanacademy.org/math/algebra2/exponential_and_logarithmic_func/log_functions/v/comparing-exponential-logarithmic-functions)  [**Graphing logarithmic functions**](https://www.khanacademy.org/math/algebra2/exponential_and_logarithmic_func/log_functions/v/graphing-logarithmic-functions)  [**Matching functions to their graphs**](https://www.khanacademy.org/math/algebra2/exponential_and_logarithmic_func/log_functions/v/matching-exponential-functions)  [**Graphs of logarithmic functions**](https://www.khanacademy.org/math/algebra2/exponential_and_logarithmic_func/log_functions/v/logarithmic-function-graphs) |
| ***Using Properties and the Change of Base Formula*** |
| [**Introduction to logarithm properties**](https://www.khanacademy.org/math/algebra2/logarithms-tutorial/logarithm_properties/v/introduction-to-logarithm-properties)  [**Introduction to logarithm properties (part 2)**](https://www.khanacademy.org/math/algebra2/logarithms-tutorial/logarithm_properties/v/introduction-to-logarithm-properties-part-2)  [**Logarithm of a power**](https://www.khanacademy.org/math/algebra2/logarithms-tutorial/logarithm_properties/v/logarithm-of-a-power)  [**Sum of logarithms with same base**](https://www.khanacademy.org/math/algebra2/logarithms-tutorial/logarithm_properties/v/sum-of-logarithms-with-same-base)  [**Using multiple logarithm properties to simplify**](https://www.khanacademy.org/math/algebra2/logarithms-tutorial/logarithm_properties/v/using-multiple-logarithm-properties-to-simplify)  [**Change of base formula**](https://www.khanacademy.org/math/algebra2/logarithms-tutorial/logarithm_properties/v/change-of-base-formula) |
| ***Solving Logarithmic Equations*** |
| [**Solving exponential equation with logarithm**](https://www.khanacademy.org/math/algebra2/logarithms-tutorial/logarithm_basics/v/exponential-equation)  [**Solving exponential equation**](https://www.khanacademy.org/math/algebra2/exponential_and_logarithmic_func/exponential-modeling/v/solve-exponentials)  [**Solving logarithmic equations**](https://www.khanacademy.org/math/algebra2/logarithms-tutorial/logarithm_properties/v/solving-logarithmic-equations)  [**Solving logarithmic equations**](https://www.khanacademy.org/math/algebra2/logarithms-tutorial/logarithm_properties/v/solving-logarithmic-equations_dup_1) |
| **Activity 6**  *Transformations of Functions*  6-1 Learning Targets:   * Graph transformations of functions and write the equations of the transformed functions. * Describe the symmetry of the graphs of even and odd functions.   6-2 Learning Targets:   * Add, subtract, multiply, and divide functions. * Transform and perform operations with piecewise-defined functions. | ***Transforming Functions*** |
| [**Recognizing odd and even functions**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/analyzing_functions/v/recognizing-odd-and-even-functions)  [**Connection between even and odd numbers and functions**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/analyzing_functions/v/connection-between-even-and-odd-numbers-and-functions)  [**Recognizing features of functions (example 1)**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/analyzing_functions/v/recognizing-features-of-functions-example-1)  [**Recognizing features of functions (example 2)**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/analyzing_functions/v/recognizing-features-of-functions-2-example-2)  [**Recognizing features of functions (example 3)**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/analyzing_functions/v/recognizing-features-of-functions-2-example-3) |
| ***Function Operations*** |
| [**Sum of functions**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/function_expressions/v/sum-of-functions)  [**Difference of functions**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/function_expressions/v/difference-of-functions)  [**Product of functions**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/function_expressions/v/product-of-functions)  [**Quotient of functions**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/function_expressions/v/quotient-of-functions) |
| **Activity 7**  *Modeling with Power Functions*  7-1 Learning Targets:   * Write an equation that models a data set. * Transform data to determine whether a power function is a good model for a data set.   7-2 Learning Targets:   * Graph power functions. * Identify and analyze key features of the graphs of power functions. | ***Finding a regression Line*** |
| [**Fitting a line to data**](https://www.khanacademy.org/math/probability/regression/regression-correlation/v/fitting-a-line-to-data)  [**Squared error of regression line**](https://www.khanacademy.org/math/probability/regression/regression-correlation/v/squared-error-of-regression-line)  [**Regression line example**](https://www.khanacademy.org/math/probability/regression/regression-correlation/v/regression-line-example)  [**Second regression example**](https://www.khanacademy.org/math/probability/regression/regression-correlation/v/second-regression-example) |
| **Activity 8**  *Compositions of Functions and Inverses*  8-1 Learning Targets:   * Determine the composition of two functions. * Determine the inverse of a function.   8-2 Learning Targets:   * Find the inverse of a function. * Restrict the domain of a function so that its inverse is also a function. | ***Composition of Functions*** |
| [**Introduction to function composition**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/composing-functions/v/function-composition)  [**Creating new function from composition**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/composing-functions/v/new-function-from-composition)  [**Evaluating composite functions example**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/composing-functions/v/evaluating-composite-functions-example-1)  [**Modeling with function composition**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/composing-functions/v/modeling-with-composite-functions) |
| ***Inverse Functions*** |
| [**Introduction to function inverses**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/function_inverses_2/v/introduction-to-function-inverses)  [**Function inverse example 1**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/function_inverses_2/v/function-inverse-example-1)  [**Function inverses example 2**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/function_inverses_2/v/function-inverses-example-2)  [**Function inverses example 3**](https://www.khanacademy.org/math/algebra2/functions_and_graphs/function_inverses_2/v/function-inverses-example-3) |
| **Unit 2: Functions and Their Graphs** | |
| **Activity 9**  *Polynomials*  9-1 Learning Targets:   * Compare models to best fit a data set. * Use a polynomial regression to make predictions.   9-2 Learning Targets:   * Describe and analyze graphs of polynomial functions. * Graph polynomial functions using technology. | ***Polynomial Functions: End Behavior*** |
| [**Polynomial end behavior**](https://www.khanacademy.org/math/algebra2/polynomial_and_rational/polynomial-end-behavior/v/polynomial-end-behavior)  [**Polynomial end behavior example**](https://www.khanacademy.org/math/algebra2/polynomial_and_rational/polynomial-end-behavior/v/polynomial-end-behavior-example)  [**Another polynomial end behavior example**](https://www.khanacademy.org/math/algebra2/polynomial_and_rational/polynomial-end-behavior/v/another-polynomial-end-behavior-example)  [**Polynomial end behavior exercise example**](https://www.khanacademy.org/math/algebra2/polynomial_and_rational/polynomial-end-behavior/v/polynomial-end-behavior-exercise-example) |
| **Activity 10**  *Analyzing Polynomial Functions*  10-1 Learning Targets:   * Analyze end behavior and zeros to sketch polynomial functions. * Understand the Fundamental Theorem of Algebra. * Understand the Linear Factorization Theorem.   10-2 Learning Targets:   * Apply the Rational Root Theorem to find zeros. * Use the Factor Theorem. * Apply the Remainder Theorem.   10-3 Learning Targets:   * Use Descartes’ Rule of Signs. * Accurately graph polynomial functions. | ***Fundamental Theorem of Algebra*** |
| [**Fundamental theorem of algebra**](https://www.khanacademy.org/math/algebra2/polynomial_and_rational/fundamental-theorem-of-algebra/v/fundamental-theorem-of-algebra-intro)  [**Fundamental theorem of algebra for quadratic**](https://www.khanacademy.org/math/algebra2/polynomial_and_rational/fundamental-theorem-of-algebra/v/fundamental-theorem-algebra-quadratic) |
| ***Factoring Polynomials*** |
| [**Factoring sum of cubes**](https://www.khanacademy.org/math/algebra2/polynomial_and_rational/factoring-higher-deg-polynomials/v/factoring-sum-of-cubes)  [**Difference of cubes factoring**](https://www.khanacademy.org/math/algebra2/polynomial_and_rational/factoring-higher-deg-polynomials/v/difference-of-cubes-factoring)  [**Factoring special products**](https://www.khanacademy.org/math/algebra/multiplying-factoring-expression/factoring-special-products/v/factoring-special-products)  [**Example: Factoring a fourth degree expression**](https://www.khanacademy.org/math/algebra2/polynomial_and_rational/factoring-higher-deg-polynomials/v/factoring-special-products-2) |
| ***Roots of Polynomial Functions*** |
| [**Possible number of real roots**](https://www.khanacademy.org/math/algebra2/polynomial_and_rational/fundamental-theorem-of-algebra/v/possible-real-roots)  [**Identifying graph based on roots**](https://www.khanacademy.org/math/algebra2/polynomial_and_rational/factoring-higher-deg-polynomials/v/identifying-graph-based-on-roots) |
| **Activity 11**  *Complex Polynomial Roots and Inequalities*  11-1 Learning Targets:   * Maximize volume in applications. * Apply the Complex Conjugate Theorem.   11-2 Learning Targets:   * Rewrite polynomial functions in factored form. * Find all of the zeros of a polynomial function.   11-3 Learning Targets:   * Solve polynomial inequalities. * Represent solutions using interval notation and graphs. | ***Complex Conjugates*** |
| [**Complex conjugates example**](https://www.khanacademy.org/math/algebra2/complex-numbers-a2/complex_numbers/v/complex-conjugates-example) |
| ***Roots of Polynomials*** |
| [**Factoring 5th degree polynomial to find real zeros**](https://www.khanacademy.org/math/algebra2/polynomial_and_rational/factoring-higher-deg-polynomials/v/factoring-5th-degree-polynomial-to-find-real-zeros) |
| **Activity 12**  *Rational Expressions and the Reciprocal Function*  12-1 Learning Targets:   * Write ratios of variable expressions. * Write a rational function based on a real-world scenario.   12-2 Learning Targets:   * Write equations for vertical and horizontal asymptotes. * Sketch the graph of a rational function. | ***Asymptotes*** |
| [**Asymptotes of rational functions**](https://www.khanacademy.org/math/algebra2/rational-expressions/rational-function-graphing/v/asymptotes-of-rational-functions)  [**Horizontal and vertical asymptotes of function**](https://www.khanacademy.org/math/algebra2/rational-expressions/rational-function-graphing/v/horizontal-vertical-asymptotes)  [**Finding horizontal and vertical asymptotes**](https://www.khanacademy.org/math/algebra2/rational-expressions/rational-function-graphing/v/finding-asymptotes-example) |
| ***Rational Functions and Their Gaphs*** |
| [**Matching rational functions to their graphs**](https://www.khanacademy.org/math/algebra2/rational-expressions/rational-function-graphing/v/example-rational-functions-graphs) |
| **Activity 13**  *Rational Functions*  13-1 Learning Targets:   * Compare and contrast graphs of rational functions. * Write and sketch graphs of transformations of rational functions.   13-2 Learning Targets:   * Determine horizontal, vertical, or oblique asymptotes. * Accurately graph rational functions. * Solve rational inequalities.   13-3 Learning Targets:   * Write the equation of a rational function given certain attributes. * Solve rational inequalities. | ***Graphing Rational Functions*** |
| [**Another rational function graph example**](https://www.khanacademy.org/math/algebra2/rational-expressions/rational-function-graphing/v/another-rational-function-graph-example)  [**A third example of graphing a rational function**](https://www.khanacademy.org/math/algebra2/rational-expressions/rational-function-graphing/v/a-third-example-of-graphing-a-rational-function) |
| ***Rational Inequalities*** |
| [**Rational inequalities**](https://www.khanacademy.org/math/algebra2/rational-expressions/solving-rational-equations/v/rational-inequalities)  [**Rational inequalities 2**](https://www.khanacademy.org/math/algebra2/rational-expressions/solving-rational-equations/v/rational-inequalities-2) |
| **Unit 3: Trigonometric Functions** | |
| **Activity 14**  *Angles and Angle Measure*  14-1 Learning Targets:   * Draw angles in standard position. * Find the initial side and terminal side of an angle in standard position. * Identify coterminal angles.   14-2 Learning Targets:   * Measure angles in radians. * Convert angle measures from degrees to radians. * Recognize trigonometric ratios to complete reference triangles. | ***Radian Measure*** |
| [**Introduction to radians**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/radians_tutorial/v/introduction-to-radians)  [**Rotation by radians and quadrants**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/radians_tutorial/v/rotation-by-radians-and-quadrants)  [**Finding arc length from radian angle measure**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/radians_tutorial/v/arc-length-from-angle-measure)  [**Example: Radian measure and arc length**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/radians_tutorial/v/radian-measure-and-arc-length)  [**Example: Converting degrees to radians**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/radians_tutorial/v/we-converting-degrees-to-radians)  [**Example: Converting radians to degrees**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/radians_tutorial/v/we-converting-radians-to-degrees)  [**Radian and degree conversion practice**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/radians_tutorial/v/radian-and-degree-conversion-practice)  [**Radians and degrees**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/radians_tutorial/v/radians-and-degrees) |
| **Activity 15**  *Sinusoidal Functions*  15-1 Learning Targets:   * Recognize situations that involve periodic data. * Sketch a graph of periodic data.   15-2 Learning Targets:   * Explore how a change in parameters affects a graph. * Determine the period, amplitude, or phase shift of a periodic function.   15-3 Learning Targets:   * Graph a periodic function with various domains. * Compare the graph of y = sin x to periodic graphs. | ***Exploring Periodic Data*** |
| [**Modeling annual temperature variation with trigonometry**](https://www.khanacademy.org/math/trigonometry/trig-function-graphs/modeling-periodic-functions/v/modeling-temperature-fluxtuations)  [**Modeling temperature through the day**](https://www.khanacademy.org/math/trigonometry/trig-function-graphs/modeling-periodic-functions/v/modeling-with-shifted-trig-functions)  [**Day length in Alaska**](https://www.khanacademy.org/math/trigonometry/trig-function-graphs/modeling-periodic-functions/v/modeling-periodic-function-with-shift) |
| ***Periodic Functions*** |
| [**Midline, amplitude and period of a function**](https://www.khanacademy.org/math/trigonometry/trig-function-graphs/trig_graphs_tutorial/v/midline-amplitude-period)  [**Example: Amplitude and period**](https://www.khanacademy.org/math/trigonometry/trig-function-graphs/trig_graphs_tutorial/v/we-amplitude-and-period)  [**Example: Amplitude and period transformations**](https://www.khanacademy.org/math/trigonometry/trig-function-graphs/trig_graphs_tutorial/v/example-amplitude-and-period-transformations)  [**Example: Amplitude and period cosine transformations**](https://www.khanacademy.org/math/trigonometry/trig-function-graphs/trig_graphs_tutorial/v/amplitude-and-period-cosine-transformations) |
| ***Graph of the Sine and Cosine Function*** |
| [**Example: Graph, domain, and range of sine function**](https://www.khanacademy.org/math/trigonometry/trig-function-graphs/trig_graphs_tutorial/v/we-graph-domain-and-range-of-sine-function)  [**Example: Graph of cosine**](https://www.khanacademy.org/math/trigonometry/trig-function-graphs/trig_graphs_tutorial/v/we-graph-of-cosine-function)  [**Example: Intersection of sine and cosine**](https://www.khanacademy.org/math/trigonometry/trig-function-graphs/trig_graphs_tutorial/v/we-graphs-of-sine-and-cosine-functions) |
| **Activity 16**  *Trigonometric Functions and the Unit Circle*  16-1 Learning Targets:   * Label points on the unit circle. * Use the unit circle to find trigonometric values.   16-2 Learning Targets:   * Define the reciprocal trigonometric functions using the unit circle. * Evaluate all six trigonometric functions for an angle in standard position | ***The Unit Circle*** |
| [**Introduction to the unit circle**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/Trig-unit-circle/v/unit-circle-definition-of-trig-functions-1)  [**Unit circle manipulative**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/Trig-unit-circle/v/unit-circle-manipulative)  [**Matching ratios to trig functions**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/Trig-unit-circle/v/matching-ratios-trig-functions)  [**Solving triangle in unit circle**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/trig-functions-special-angles/v/solving-triangle-unit-circle)  [**Finding trig functions of special angles example**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/trig-functions-special-angles/v/trig-functions-special-angles) |
| ***Reciprocal Trigonometric Functions*** |
| [**Secant (sec), cosecant (csc) and cotangent (cot) example**](https://www.khanacademy.org/math/trigonometry/basic-trigonometry/reciprocal-trig-functions/v/example-the-six-trig-ratios)  [**Example: Using trig to solve for missing information**](https://www.khanacademy.org/math/trigonometry/basic-trigonometry/reciprocal-trig-functions/v/example-using-trig-to-solve-for-missing-information) |
| **Activity 17**  *Graphs of the form y* = *A* sin[*B*(*x* – *C*)] + *D*  17-1 Learning Targets:   * Graph a trigonometric function over a specified interval. * Describe how changing parameters affect a trigonometric graph..   17-2 Learning Targets:   * Find the amplitude and period of a trigonometric function. * Write a trigonometric function given its graph. * Model situations with trigonometric functions. | ***Trigonometric Graphs*** |
| [**Example: Figure out the trig function**](https://www.khanacademy.org/math/trigonometry/trig-function-graphs/trig_graphs_tutorial/v/matching-a-trigonometric-function-to-its-graph)  [**Determining the equation of a trig function**](https://www.khanacademy.org/math/trigonometry/trig-function-graphs/trig_graphs_tutorial/v/trig-function-equation) |
| **Activity 18**  *Graphs of Trigonometric Functions*  18-1 Learning Targets:   * Sketch the graphs of csc x, sec x, tan x, and cot x. * Find the period and locate asymptotes of reciprocal trig functions. * Determine the domain and range of reciprocal trig functions.   18-2 Learning Targets:   * Graph transformations of reciprocal trig functions. * Describe how changing parameters affect a trigonometric graph. | ***Tangent Graph*** |
|  |
| **Activity 19**  *Inverse Trigonometric Functions*  19-1 Learning Targets:   * Apply a trigonometric function to a real-world situation. * Define and apply the inverse cosine function.   19-2 Learning Targets:   * Relate one-to-one functions to inverse trigonometric functions. * Define and apply the inverse sine function.   19-3 Learning Targets:   * Define and apply the inverse tangent function. * Find values of inverse trigonometric functions. | ***Inverse Cosine Functions*** |
| [**Inverse trig functions: arccos**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/inverse_trig_functions/v/inverse-trig-functions-arccos)  [**Example: Calculator to evaluate inverse trig function**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/inverse_trig_functions/v/example-calculator-to-evaluate-inverse-trig-function) |
| ***Inverse Sine Functions*** |
| [**Inverse trig functions: arcsin**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/inverse_trig_functions/v/inverse-trig-functions-arcsin)  [**Example: Calculator to evaluate inverse trig function**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/inverse_trig_functions/v/example-calculator-to-evaluate-inverse-trig-function) |
| ***Inverse Tangent Functions*** |
| [**Inverse trig functions: arctan**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/inverse_trig_functions/v/inverse-trig-functions-arctan)  [**Example: Calculator to evaluate inverse trig function**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/inverse_trig_functions/v/example-calculator-to-evaluate-inverse-trig-function) |
| ***Modeling with Trigonometric Functions*** |
| [**Inverse tan domain and range**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/inverse_trig_functions/v/inverse-tan-domain)  [**Inverse tangent scenario**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/inverse_trig_functions/v/inverse-tan-scenario)  [**Angle of sun with the ground based on shadow**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/inverse_trig_functions/v/angle-sun-with-ground)  [**Modeling annual temperature variation with trigonometry**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/inverse_trig_functions/v/modeling-temperature-fluxtuations)  [**Applying inverse trig function with model**](https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/inverse_trig_functions/v/inverse-trig-with-model) |
| **Activity 20**  *Solving Simple Trigonometric Equations*  20-1 Learning Targets:   * Apply a trigonometric equation to represent a real-world situation. * Find the general solution to a trigonometric equation   20-2 Learning Targets:   * Use reference angles to solve trigonometric equations. * Find the solution to a trigonometric equation over an interval. * Generate a trigonometric equation for a real-world situation | **N/A** |
| **Unit 4: Analytic Trigonometry and Trigonometric Applications** | |
| **Activity 21**  *Trigonometric Identities*  21-1 Learning Targets:   * Define the reciprocal and quotient identities. * Use and transform the Pythagorean identity.   21-2 Learning Targets:   * Simplify trigonometric expressions. * Verify trigonometric identities. | ***Trigonometric Identities*** |
| [**Pythagorean trig identity from soh cah toa**](http://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/pythagorean-identity/v/pythagorean-trig-identity-from-soh-cah-toa)  [**Pythagorean trig identity from unit circle**](http://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/pythagorean-identity/v/pythagorean-trig-identity-from-unit-circle)  [**Using the Pythagorean trig identity**](http://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/pythagorean-identity/v/using-the-pythagorean-trig-identity) |
| ***Simplifying Trigonometric Expressions*** |
| [**Examples using pythagorean identities to simplify trigonometric expressions**](http://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/pythagorean-identity/v/examples-using-pythagorean-identities-to-simplify-trigonometric-expressions) |
| **Activity 22**  *Identities and Equations*  22-1 Learning Targets:   * Use the unit circle to write equivalent trigonometric expressions. * Write cofunction identities for sine and cosine.   22-2 Learning Targets:   * Use trigonometric identities to solve equations. * Solve trigonometric equations by graphing. | **N/A** |
| **Activity 23**  *Multiple Angle Identities*  23-1 Learning Targets:   * Model a sound wave with a trigonometric function. * Derive an expression for the cosine of a difference.   23-2 Learning Targets:   * Write the sum and difference identities for sine, cosine, and tangent. * Use sum and difference identities to find exact values of a trig function. * Derive the double angle and half angle identities.   23-3 Learning Targets:   * Use trigonometric identities to solve equations. * Verify trigonometric identities | ***Exploring Sums of Trig Functions*** |
| [**Applying angle addition formula for sin**](https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/angle-addition-formulas-trig/v/sin-angle-addition)  [**Angle addition formula with cosine**](https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/angle-addition-formulas-trig/v/cosine-angle-addition)  [**Another example using angle addition formula with cosine**](https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/angle-addition-formulas-trig/v/cosine-angle-addition-2)  [**Sine of non special angle**](https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/angle-addition-formulas-trig/v/sine-angle-addition-2)  [**Cosine addition identity example**](https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/angle-addition-formulas-trig/v/cosine-addition-identity-example)  [**Proof of angle addition formula for sine**](https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/angle-addition-formula-proofs/v/proof-angle-addition-sine)  [**Proof of angle addition formula for cosine**](https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/angle-addition-formula-proofs/v/proof-angle-addition-cosine) |
| ***Double Angle Formulas*** |
| [**Double angle formula for cosine example**](https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/angle-addition-formulas-trig/v/double-angle-formula-for-cosine-example-c) |
| **Activity 24**  *Law of Cosines*  24-1 Learning Targets:   * Use trigonometry to draw and interpret diagrams for a model. * Write a trigonometric function for a real-world situation   24-2 Learning Targets:   * Write equations for the Law of Cosines using a standard angle. * Apply the Law of Cosines in real-world and mathematical situations. | ***Law of Cosines*** |
| [**Law of cosines**](https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/law-sines-cosines/v/law-of-cosines-example)  [**Law of cosines to determine grade**](https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/law-sines-cosines/v/law-of-cosines-missing-angle)  [**Law of cosines for star distance**](https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/law-sines-cosines/v/law-of-cosines-word-problem)  [**Proof of the law of cosines**](https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/law-sines-cosines/v/law-of-cosines) |
| **Activity 25**  *Law of Sines*  25-1 Learning Targets:   * Calculate the bearing of a flight. * Derive and use the Law of Sines. * Find unknown sides or angles in oblique triangles.   25-2 Learning Targets:   * Determine the number of distinct triangles given certain criteria. * Use the Law of Sines to solve triangles with unknown sides or angles. | ***Law of Sines*** |
| [**Law of sines**](https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/law-sines-cosines/v/law-of-sines)  [**Law of sines for missing angle**](https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/law-sines-cosines/v/law-of-sines-example)  [**Proof: Law of sines**](https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/law-sines-cosines/v/proof-law-of-sines) |
| **Unit 5: Conics, Parametric Equations, and Vectors** | |
| **Activity 26**  *Parabola Equations and Graphs*  26-1 Learning Targets:   * Define conic sections as intersections of a double-napped cone. * Relate the locus definition of a parabola to its equation. * Find the inverse relation for a parabola.   26-2 Learning Targets:   * Find the standard form of a parabola. * Graph parabolas in the coordinate plane. * Find the focus, directrix, and axis of symmetry of a parabola. * Find the equation of a parabola with certain characteristics. | ***Parabolas and Conic Sections*** |
| [**Introduction to conic sections**](https://www.khanacademy.org/math/algebra2/conics_precalc/conic_section_intro/v/introduction-to-conic-sections) |
| ***Graphs of Parabolas*** |
| [**Examples: Graphing and interpreting quadratics**](http://www.khanacademy.org/math/algebra/quadratics/quadratic_odds_ends/v/algebra-ii-shifting-quadratic-graphs)  [**Graphing a parabola with a table of values**](http://www.khanacademy.org/math/algebra/quadratics/solving_graphing_quadratics/v/graphing-a-quadratic-function)  [**Graphing a parabola by finding the roots and vertex**](http://www.khanacademy.org/math/algebra/quadratics/solving_graphing_quadratics/v/quadratic-functions-3)  [**Graphing a parabola using roots and vertex**](http://www.khanacademy.org/math/algebra/quadratics/solving_graphing_quadratics/v/graphing-a-parabola-using-roots-and-vertex)  [**Multiple examples graphing parabolas using roots and vertices**](http://www.khanacademy.org/math/algebra/quadratics/solving_graphing_quadratics/v/graphs-of-quadratic-functions) |
| ***Graphs and Equations of Parabolas*** |
| [**Parabola vertex and axis of symmetry**](http://www.khanacademy.org/math/algebra/quadratics/solving_graphing_quadratics/v/quadratic-functions-2)  [**Focus and directrix introduction**](http://www.khanacademy.org/math/algebra2/conics_precalc/parabolas_precalc/v/focus-and-directrix-introduction)  [**Using the focus and directrix to find the equation of a parabola**](http://www.khanacademy.org/math/algebra2/conics_precalc/parabolas_precalc/v/using-the-focus-and-directrix-to-find-the-equation-of-a-parabola)  [**Equation for parabola from focus and directrix**](http://www.khanacademy.org/math/algebra2/conics_precalc/parabolas_precalc/v/equation-for-parabola-from-focus-and-directrix)  [**Finding focus and directrix from vertex**](http://www.khanacademy.org/math/algebra2/conics_precalc/parabolas_precalc/v/finding-focus-and-directrix-from-vertex)  [**Finding the vertex of a parabola example**](http://www.khanacademy.org/math/algebra/quadratics/solving_graphing_quadratics/v/finding-the-vertex-of-a-parabola-example) |
| **Activity 27**  *Ellipses and Hyperbolas*  27-1 Learning Targets:   * Define and sketch an ellipse. * Determine the equation of an ellipse. * Graph an ellipse using its characteristics.   27-2 Learning Targets:   * Define and sketch a hyperbola. * Determine the equation of a hyperbola. * Graph a hyperbola using its characteristics.   27-3 Learning Targets:   * Graph hyperbolas to represent a real-world problem. * Use equations of hyperbolas to find intersection points. | ***Ellipses*** |
| [**Conic sections: Intro to ellipses**](https://www.khanacademy.org/math/algebra2/conics_precalc/ellipses-precalc/v/conic-sections-intro-to-ellipses)  [**Foci of an ellipse**](https://www.khanacademy.org/math/algebra2/conics_precalc/ellipses-precalc/v/foci-of-an-ellipse)  [**Identifying an ellipse from equation**](https://www.khanacademy.org/math/algebra2/conics_precalc/conics_precalc_eqs/v/identifying-conics-1) |
| ***Hyperbolas*** |
| [**Conic sections: Intro to hyperbolas**](https://www.khanacademy.org/math/algebra2/conics_precalc/hyperbolas-precalc/v/conic-sections-intro-to-hyperbolas)  [**Conic sections: Hyperbolas 2**](https://www.khanacademy.org/math/algebra2/conics_precalc/hyperbolas-precalc/v/conic-sections-hyperbolas-2)  [**Conic sections: Hyperbolas 3**](https://www.khanacademy.org/math/algebra2/conics_precalc/hyperbolas-precalc/v/conic-sections-hyperbolas-3)  [**Foci of a hyperbola**](https://www.khanacademy.org/math/algebra2/conics_precalc/hyperbolas-precalc/v/foci-of-a-hyperbola)  [**Proof: Hyperbola foci**](https://www.khanacademy.org/math/algebra2/conics_precalc/hyperbolas-precalc/v/proof-hyperbola-foci)  [**Identifying a hyperbola from an equation**](https://www.khanacademy.org/math/algebra2/conics_precalc/conics_precalc_eqs/v/identifying-conics-2)  [**Hyperbola and parabola examples**](https://www.khanacademy.org/math/algebra2/conics_precalc/conics_precalc_eqs/v/algebra-conic-sections) |
| **Activity 28**  *Polar Graphs*  28-1 Learning Targets:   * Understand and use the polar grid. * Define polar coordinates. * Plot and label points in the polar grid.   28-2 Learning Targets:   * Convert rectangular coordinates to a polar point (r, θ). * Convert polar coordinates to a rectangular point (x, y).   28-3 Learning Targets:   * Express x and y in terms of r and θ. * Sketch polar curves on the polar grid. * Use polar functions to represent real-world situations. | ***Polar Coordinates*** |
| [**Polar coordinates 1**](https://www.khanacademy.org/math/precalculus/parametric_equations/polar_coor/v/polar-coordinates-1)  [**Polar coordinates 2**](https://www.khanacademy.org/math/precalculus/parametric_equations/polar_coor/v/polar-coordinates-2)  [**Polar coordinates 3**](https://www.khanacademy.org/math/precalculus/parametric_equations/polar_coor/v/polar-coordinates-3) |
| **Activity 29**  *Polar Curves and Polar Conics*  29-1 Learning Targets:   * Sketch graphs represented by polar equations. * Compare and contrast polar graphs. * Write equivalent rectangular and polar equations.   29-2 Learning Targets:   * Convert a polar equation to rectangular form. * Convert a rectangular equation to polar form. * Describe and sketch graphs of polar equations.   29-3 Learning Targets:   * Classify different types of polar equations. * Explore patterns in the graphs of polar curves. * Predict the resulting graph for a polar equation. | **N/A** |
| **Activity 30**  *Parametric Equations*  30-1 Learning Targets:   * Use data points on a grid to write linear equations. * Interpret the parameters of an equation in a real-world context. * Write rules to describe the position of an object at time t.   30-2 Learning Targets:   * Define and write parametric equations. * Use parametric equations to solve real-world problems.   30-3 Learning Targets:   * Convert equations from rectangular to parametric, and vice versa. * Use parametric equations to solve real-world problems. | ***Parametric Equations*** |
| [**Parametric equations 1**](https://www.khanacademy.org/math/precalculus/parametric_equations/parametric/v/parametric-equations-1)  [**Parametric equations 2**](https://www.khanacademy.org/math/precalculus/parametric_equations/parametric/v/parametric-equations-2)  [**Parametric equations 3**](https://www.khanacademy.org/math/precalculus/parametric_equations/parametric/v/parametric-equations-3)  [**Parametric equations 4**](https://www.khanacademy.org/math/precalculus/parametric_equations/parametric/v/parametric-equations-4) |
| **Activity 31**  *Parametric Equations Revisited*  31-1 Learning Targets:   * Understand, calculate, and compare angular and linear velocities. * Write equations to model circular motion. * Sketch the graph of circular motion.   31-2 Learning Targets:   * Sketch the graph of a moving object. * Write parametric equations using trigonometry. * Use technology to model motion.   31-3 Learning Targets:   * Understand and apply the equations for projectile motion. * Write and graph parametric equations. * Solve real-world problems involving projectile motion. | ***Parametric Equations*** |
| [**Parametric equations 1**](https://www.khanacademy.org/math/precalculus/parametric_equations/parametric/v/parametric-equations-1)  [**Parametric equations 2**](https://www.khanacademy.org/math/precalculus/parametric_equations/parametric/v/parametric-equations-2)  [**Parametric equations 3**](https://www.khanacademy.org/math/precalculus/parametric_equations/parametric/v/parametric-equations-3)  [**Parametric equations 4**](https://www.khanacademy.org/math/precalculus/parametric_equations/parametric/v/parametric-equations-4) |
| **Activity 32**  *Vectors and Complex Numbers*  32-1 Learning Targets:   * Understand and model rectilinear motion. * Define and use vectors. * Use the notation for position vectors.   32-2 Learning Targets:   * Understand and model rectilinear motion. * Define and use vectors. * Use the notation for position vectors.   32-3 Learning Targets:   * Find the direction angle of a vector. * Resolve a vector into its components. * Sketch vectors and vector sums in the coordinate plane   32-4 Learning Targets:   * Represent complex numbers as vectors. * Find the conjugate of a complex number. * Add, subtract, multiply, and divide complex numbers.   32-5 Learning Targets:   * Find the polar form of a complex number. * Represent complex numbers in polar form in the complex plane. | ***Introduction to Vectors*** |
| [**Vector representations exercise example**](https://www.khanacademy.org/math/precalculus/vectors-precalc/vector-basic/v/vector-representations-example)  [**Classifying vectors and quantities example**](https://www.khanacademy.org/math/precalculus/vectors-precalc/vector-basic/v/classifying-vectors-and-quantities-example) |
| ***Operations with Vectors*** |
| [**Multiplying a vector by a scalar**](https://www.khanacademy.org/math/precalculus/vectors-precalc/vector-basic/v/multiplying-vector-by-scalar)  [**Visualizing vector addition examples**](https://www.khanacademy.org/math/precalculus/vectors-precalc/vector-basic/v/visualizing-vector-addition-examples)  [**Adding vectors**](https://www.khanacademy.org/math/precalculus/vectors-precalc/rect-form/v/adding-vectors)  [**Adding vectors exercise example**](https://www.khanacademy.org/math/precalculus/vectors-precalc/rect-form/v/adding-vectors-exercise-example)  [**Subtracting vectors exercise example**](https://www.khanacademy.org/math/precalculus/vectors-precalc/vector-basic/v/subtracting-vectors-exercise-example) |
| ***Vector Components*** |
| [**Breaking down vectors into components**](https://www.khanacademy.org/math/precalculus/vectors-precalc/magnitude-direction/v/mag-dir-vec-sums)  [**Magnitude and direction of vector sums**](https://www.khanacademy.org/math/precalculus/vectors-precalc/magnitude-direction/v/mag-dir-vec-sums-2)  [**Magnitude of vector sums**](https://www.khanacademy.org/math/precalculus/vectors-precalc/magnitude-direction/v/mag-vec-sums) |
| ***Complex Numbers and Operations*** |
| [**Introduction to complex numbers**](https://www.khanacademy.org/math/algebra2/complex-numbers-a2/complex_numbers/v/introduction-to-complex-numbers)  [**Plotting complex numbers on the complex plane**](https://www.khanacademy.org/math/algebra2/complex-numbers-a2/complex_numbers/v/plotting-complex-numbers-on-the-complex-plane)  [**Adding complex numbers**](https://www.khanacademy.org/math/algebra2/complex-numbers-a2/complex_numbers/v/adding-complex-numbers)  [**Subtracting complex numbers**](https://www.khanacademy.org/math/algebra2/complex-numbers-a2/complex_numbers/v/subtracting-complex-numbers)  [**Multiplying complex numbers**](https://www.khanacademy.org/math/algebra2/complex-numbers-a2/complex_numbers/v/multiplying-complex-numbers)  [**Dividing complex numbers**](https://www.khanacademy.org/math/algebra2/complex-numbers-a2/complex_numbers/v/dividing-complex-numbers) |
| ***Polar Form*** |
| [**Complex number polar form intuition exercise**](https://www.khanacademy.org/math/precalculus/imaginary_complex_precalc/complex_analysis/v/complex-number-polar-form-intuition-exercise)  [**Rectangular to polar form of complex number**](https://www.khanacademy.org/math/precalculus/imaginary_complex_precalc/complex_analysis/v/polar-form-complex-number) |
| **Activity 33**  *Applications of Vectors*  33-1 Learning Targets:   * Write equations to describe rectilinear motion. * Use vectors to describe velocity of an object. * Interpret speed as the magnitude of a velocity vector.   33-2 Learning Targets:   * Use vectors to describe planar motion. * Graph position vectors in the coordinate plane. * Write a vector equation to model a real-world context. | **N/A** |
| **Unit 6: Matrices, Systems of Equations, and Volume** | |
| **Activity 34**  *Matrix Operations*  34-1 Learning Targets:   * Use matrices to represent numeric data. * Add and subtract matrices. * Define and use scalar multiplication.   34-2 Learning Targets:   * Determine if two matrices can be multiplied. * Find the matrix product of two matrices. * Explore properties of matrix operations.   34-3 Learning Targets:   * Determine if a matrix has an inverse. * Find the determinant and inverse of a matrix. * Justify properties of matrix operations. | ***Representing Data with Matrices*** |
| [**Introduction to the matrix**](http://www.khanacademy.org/math/algebra2/alg2-matrices/basic-matrix-operations-alg2/v/introduction-to-the-matrix)  [**Representing data with matrices**](http://www.khanacademy.org/math/algebra2/alg2-matrices/basic-matrix-operations-alg2/v/data-in-matrices)  [**Matrix addition and subtraction**](http://www.khanacademy.org/math/algebra2/alg2-matrices/basic-matrix-operations-alg2/v/matrix-addition-and-subtraction-1)  [**Scalar multiplication**](https://www.khanacademy.org/math/algebra2/alg2-matrices/basic-matrix-operations-alg2/v/scalar-multiplication) |
| ***Matrix Multiplication*** |
| [**Matrix multiplication introduction**](http://www.khanacademy.org/math/algebra2/alg2-matrices/matrix-multiplication-alg2/v/matrix-multiplication-intro)  [**Multiplying a matrix by a matrix**](http://www.khanacademy.org/math/algebra2/alg2-matrices/matrix-multiplication-alg2/v/multiplying-a-matrix-by-a-matrix)  [**Defined and undefined matrix operations**](http://www.khanacademy.org/math/algebra2/alg2-matrices/matrix-multiplication-alg2/v/defined-and-undefined-matrix-operations) |
| ***Inverse Matrices*** |
| [**Finding the determinant of a 2x2 matrix**](https://www.khanacademy.org/math/precalculus/precalc-matrices/inverting_matrices/v/finding-the-determinant-of-a-2x2-matrix)  [**Inverse of a 2x2 matrix**](https://www.khanacademy.org/math/precalculus/precalc-matrices/inverting_matrices/v/inverse-of-a-2x2-matrix)  [**Idea behind inverting a 2x2 matrix**](https://www.khanacademy.org/math/precalculus/precalc-matrices/inverting_matrices/v/inverse-matrix-part-1)  [**Finding the determinant of a 3x3 matrix method 1**](https://www.khanacademy.org/math/precalculus/precalc-matrices/inverting_matrices/v/finding-the-determinant-of-a-3x3-matrix-method-1)  [**Finding the determinant of a 3x3 matrix method 2**](https://www.khanacademy.org/math/precalculus/precalc-matrices/inverting_matrices/v/finding-the-determinant-of-a-3x3-matrix-method-2) |
| **Activity 35**  *Matrices and Transformations*  35-1 Learning Targets:   * Use matrices as vectors to translate figures in the plane. * Use matrices as vectors to reflect figures in the plane.   35-2 Learning Targets:   * Use matrices as vectors to rotate figures in the plane. * Use matrices as vectors to dilate figures in the plane.   35-3 Learning Targets:   * Work with matrices to represent real-world situations. * Interpret absolute value of determinants as areas. | ***Linear Transformations*** |
| [**Linear transformation examples: Scaling and reflections**](https://www.khanacademy.org/math/linear-algebra/matrix_transformations/lin_trans_examples/v/linear-transformation-examples-scaling-and-reflections)  [**Linear transformation examples: Rotations in R2**](https://www.khanacademy.org/math/linear-algebra/matrix_transformations/lin_trans_examples/v/linear-transformation-examples-rotations-in-r2) |
| **Activity 36**  *Matrices and Systems of Equations*  36-1 Learning Targets:   * Write a linear system of equations as a matrix equation. * Represent a real-world situation with a matrix equation. * Identify the coefficient matrix, variable matrix, and constant matrix.   36-2 Learning Targets:   * Use an inverse matrix to solve a matrix equation. * Connect the existence of an inverse matrix to solutions of systems.   36-3 Learning Targets:   * Use technology to solve large linear systems. * Solve a 3 × 3 matrix equation using technology. | ***Matrices and Systems of Equations*** |
| [**Matrices to solve a system of equations**](https://www.khanacademy.org/math/precalculus/precalc-matrices/inverting_matrices/v/matrices-to-solve-a-system-of-equations)  [**Matrix equations and systems**](https://www.khanacademy.org/math/precalculus/precalc-matrices/matrix-equations/v/matrix-equations-systems) |
| **Activity 37**  *Volume*  37-1 Learning Targets:   * Understand Cavalieri’s Principle. * Relate Cavalieri’s Principle to volume formulas.   37-2 Learning Targets:   * Informally derive the formula for the volume of a sphere. * Use volume formulas to solve real-world problems.   37-3 Learning Targets:   * Informally derive the formula for the volume of a sphere. * Understand the concept of a limit. * Represent a volume using sums and limits | ***Volume of Spheres*** |
| [**Volume of a sphere**](https://www.khanacademy.org/math/integral-calculus/solid_revolution_topic/solid_of_revolution/v/solid-of-revolution-part-3) |
| ***Limits*** |
| [**Introduction to limits**](https://www.khanacademy.org/math/precalculus/limit_topic_precalc/limits_precalc/v/introduction-to-limits-hd)  [**Limit examples (part 1)**](https://www.khanacademy.org/math/precalculus/limit_topic_precalc/limits_precalc/v/limit-examples-part-1)  [**Limit examples (part 2)**](https://www.khanacademy.org/math/precalculus/limit_topic_precalc/limits_precalc/v/limit-examples-part-2)  [**Limit examples (part 3)**](https://www.khanacademy.org/math/precalculus/limit_topic_precalc/limits_precalc/v/limit-examples-part3) |