**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) |