

Skills Needed Document

Exponents

- Positive and Negative Numbers Raised to Integers
- Negative Exponents
- Fractional Exponents
- Exponent of Zero
- Simplifying Rational Expressions
- Squaring a Binomial

Properties of Exponents: <https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-numbers-operations/cc-8th-exponent-properties/v/exponent-properties-involving-products>

Negative Exponents: <https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-numbers-operations/cc-8th-pos-neg-exponents/a/negative-exponents-review>

Exponents with Negative Bases: <https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-numbers-operations/exponents-with-negative-bases/v/exponents-with-negative-bases>

Fractional Exponents: <https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:exp/x2ec2f6f830c9fb89:rational-exp/v/basic-fractional-exponents>

Exponent of Zero or One: <https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-numbers-operations/exponents-with-negative-bases/v/raising-a-number-to-the-0th-and-1st-power>

Simplifying Rational Expressions: <https://www.khanacademy.org/math/math3/x5549cc1686316ba5:rational/x5549cc1686316ba5:common-factors/v/simplifying-rational-expressions-introduction>

Squaring a Binomial: <https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratics-multiplying-factoring/x2f8bb11595b61c86:special-product-binomials/v/square-a-binomial>

Simplifying Expressions Involving Fractions

- Multiplying/Dividing Fractions
- Adding/Subtracting Fractions
- Compound Fractions
- Adding Rational Expressions
- Simplifying
- Factoring Out a Negative 1

Multiplying Fractions: <https://www.khanacademy.org/math/cc-fifth-grade-math/5th-multiply-fractions/imp-multiplying-fractions/v/multiplying-fractions>

Dividing Fractions: <https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-arithmetic-operations/cc-6th-dividing-fractions/v/dividing-fractions-example>

Adding Fractions: <https://www.khanacademy.org/math/cc-fifth-grade-math/imp-fractions-3/imp-adding-and-subtracting-fractions-with-unlike-denominators/v/adding-small-fractions-with-unlike-denominators>

Subtracting Fractions: <https://www.khanacademy.org/math/cc-fifth-grade-math/imp-fractions-3/imp-adding-and-subtracting-fractions-with-unlike-denominators/v/subtracting-small-fractions-with-unlike-denominators>

Simplify Complex Fractions (Algebra):

https://www.wtamu.edu/academic/anns/mps/math/mathlab/int_algebra/int_alg_tut34_complex.htm

<https://www.youtube.com/watch?v=IAAzKsFtZ6Y>

Simplify Complex Fractions (Arithmetic): <https://www.khanacademy.org/math/arithmetic-home/negative-numbers/mult-divide-negatives/v/making-sense-of-hairy-fractions>

Adding Rational Expressions: <https://www.khanacademy.org/math/precalculus/x9e81a4f98389efdf:rational-functions/x9e81a4f98389efdf:adding-and-subtracting-rational-expressions/v/adding-rational-expression-w-unlike-denominators>

Simplifying a Rational Expression:

<https://www.khanacademy.org/math/math3/x5549cc1686316ba5:rational/x5549cc1686316ba5:rational-mul-div/v/multiplying-and-dividing-rational-expressions-3>

Factoring out a -1:

<https://www.khanacademy.org/math/math3/x5549cc1686316ba5:rational/x5549cc1686316ba5:common-factors/v/simplifying-rational-expressions-3>

Binomials and Factoring

- Factoring Common Terms
- Difference of Two Squares
- Factoring Quadratic Expressions with an x^2 coefficient of 1
- Factoring Quadratic Expressions with an x^2 coefficient other than 1
- Factoring Quadratic-Like Expressions
- Factoring multiple times
- Multiplying or Squaring or Cubing Binomials

Factoring Common Terms: <https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:poly-factor/x2ec2f6f830c9fb89:common-factor/v/algebraic-factoring-by-greatest-common-monomial-factor>

Difference of Squares: <https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:poly-factor/x2ec2f6f830c9fb89:factor-w-structure/v/factoring-difference-of-squares>

Factoring Quadratics with lead coefficient 1:

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratics-multiplying-factoring/x2f8bb11595b61c86:factor-quadratics-intro/v/factoring-simple-quadratic-expression>

Factoring Quadratics with lead coefficient not 1:

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratics-multiplying-factoring/x2f8bb11595b61c86:factor-quadratics-intro/v/factoring-quadratics-common-factor>

Factoring Quadratic-Like Expressions: <https://www.youtube.com/watch?v=0yBDsZvfT0g>

Factoring Multiple Times: <https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:poly-factor/x2ec2f6f830c9fb89:factor-high-deg/v/factoring-perfect-square-polynomial>

Multiplying Binomials: <https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratics-multiplying-factoring/x2f8bb11595b61c86:multiply-binomial/v/multiplying-binomials>

Squaring Binomials: <https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratics-multiplying-factoring/x2f8bb11595b61c86:special-product-binomials/v/square-a-binomial>

Cubing Binomials: https://www.youtube.com/watch?v=_PiHgBMJ1RQ

Solving Equations and Inequalities

- Combining Like Terms
- Equations Involving Fractions
- Quadratic Equations
- Equations Involving a Square Root
- Equations Involving Absolute Values
- Solving Inequalities

Combining like terms: <https://www.khanacademy.org/math/algebra-home/alg-basic-eq-ineq/alg-old-school-equations/v/algebra-linear-equations-3>

Equations Involving Fractions: <https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:solve-equations-inequalities/x2f8bb11595b61c86:linear-equations-variables-both-sides/v/solving-equations-with-the-distributive-property-2>

Equations with a Variable in the Denominator: <https://www.khanacademy.org/math/algebra-home/alg-rational-expr-eq-func/alg-solving-rational-equations/v/solving-rational-equations-2>

Solving Quadratic Equations: <https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations/x2f8bb11595b61c86:quadratics-solve-factoring/v/example-1-solving-a-quadratic-equation-by-factoring>

Solving Equations with a Square Root:
<https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:eq/x2ec2f6f830c9fb89:sqrt-eq/v/solving-radical-equations>

Solving Equations with Absolute Value: <https://www.khanacademy.org/math/algebra-home/alg-absolute-value/alg-absolute-value-equations/v/absolute-value-equation-example>

Solving Inequalities: <https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:solve-equations-inequalities/x2f8bb11595b61c86:multistep-inequalities/v/multi-step-inequalities>

Analytic Geometry

- Slope-Intercept Form of a Line
- Point-Slope Form of a Line
- Horizontal and Vertical Lines
- Graphs of Lines
- Slope Between Two Points
- Equation of a Line Between Two Points
- Parallel or Perpendicular Lines
- Equation of a Circle
- Graphing Inequalities

Slope-Intercept Form of a Line From the Equation:
<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:forms-of-linear-equations/x2f8bb11595b61c86:intro-to-slope-intercept-form/v/less-obvious-slope-intercept-form>

Slope-Intercept Form of a Line From the Graph:
<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:forms-of-linear-equations/x2f8bb11595b61c86:writing-slope-intercept-equations/v/graphs-using-slope-intercept-form>

Slope-Intercept Equation from the slope and a point:

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:forms-of-linear-equations/x2f8bb11595b61c86:writing-slope-intercept-equations/v/equation-of-a-line-1>

Point-Slope Form of a Line: <https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:forms-of-linear-equations/x2f8bb11595b61c86:point-slope-form/v/idea-behind-point-slope-form>

Horizontal and Vertical Lines: <https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:linear-equations-graphs/x2f8bb11595b61c86:horizontal-vertical-lines/v/examples-of-slopes-and-equations-of-horizontal-and-vertical-lines>

Finding the Slope of a Line: <https://www.khanacademy.org/math/algebra-basics/alg-basics-graphing-lines-and-slope/alg-basics-slope/v/slope-and-rate-of-change>

Finding the Equation of a Line Given Two Points:

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:forms-of-linear-equations/x2f8bb11595b61c86:summary-forms-of-two-variable-linear-equations/v/point-slope-and-standard-form>

Equations of Parallel Lines: <https://www.khanacademy.org/math/geometry/hs-geo-analytic-geometry/hs-geo-parallel-perpendicular-eq/v/parallel-lines>

Equations of Perpendicular Lines: <https://www.khanacademy.org/math/geometry/hs-geo-analytic-geometry/hs-geo-parallel-perpendicular-eq/v/perpendicular-lines-2>

Equation of a Circle: <https://www.khanacademy.org/math/geometry/xff63fac4:hs-geo-conic-sections/hs-geo-circle-standard-equation/v/writing-standard-equation-of-circle>

Graphs of Inequalities: <https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:inequalities-systems-graphs/x2f8bb11595b61c86:graphing-two-variable-inequalities/v/graphing-inequalities>

Functions

- Function Notation
- Plugging Values Into a Function
- Finding the Value of a Function Using a Graph
- Combining Functions
- Parabolas
- Cubed Root
- Function Composition
- Piece-wise Defined Functions

Function Notation and Substituting Values into a Function: <https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-linear-equations-functions/8th-functions-and-function-notation/v/understanding-function-notation-example-3>

Finding the Value of a Function using a Graph:

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:functions/x2f8bb11595b61c86:evaluating-functions/v/understanding-function-notation-example-2>

Combining Functions (Subtraction): <https://www.khanacademy.org/math/algebra-home/alg-functions/alg-combining-functions/v/difference-of-functions>

Combining Functions (Multiplication): <https://www.khanacademy.org/math/algebra-home/alg-functions/alg-combining-functions/v/product-of-functions>

Parabolas: <https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations/x2f8bb11595b61c86:intro-parabolas/v/parabolas-intro>

Cube Root: <https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:rational-exponents-radicals/x2f8bb11595b61c86:radicals/v/introduction-to-cube-roots>

Composition of Functions:

<https://www.khanacademy.org/math/precalculus/x9e81a4f98389efdf:composite/x9e81a4f98389efdf:composing/v/new-function-from-composition>

Evaluating Piecewise Functions: <https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:absolute-value-piecewise-functions/x2f8bb11595b61c86:piecewise-functions/v/evaluating-piecewise-functions-example>

Trigonometry

- Reciprocal Identities
- Soh-Cah-Toa
- Conversion from Degrees to Radians or Radians to Degrees
- $\sin(x)$, $\cos(x)$, $\tan(x)$ for Common Values
- Recognizing the graphs of $\sin(x)$, $\cos(x)$, and $\tan(x)$
- ASTC, Recognizing Where Each Function is Positive or Negative
- Pythagorean Identity: $\sin^2 x + \cos^2 x = 1$
- Pythagorean Theorem
- Reference Angles

Reciprocal Identities: <https://www.khanacademy.org/math/trigonometry/trigonometry-right-triangles/reciprocal-trig-ratios/a/reciprocal-trig-ratios>

Soh-Cah-Toa: <https://www.khanacademy.org/math/geometry-home/right-triangles-topic/intro-to-the-trig-ratios-geo/v/basic-trigonometry>

Converting Radians to Degrees:

<https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:trig/x2ec2f6f830c9fb89:radians/v/we-converting-radians-to-degrees>

Converting Degrees to Radians:

<https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:trig/x2ec2f6f830c9fb89:radians/v/we-converting-degrees-to-radians>

Sin, Cos, Tan for 30-60-90 (in radians):

<https://www.khanacademy.org/math/precalculus/x9e81a4f98389efdf:trig/x9e81a4f98389efdf:special-trigonometric-values-in-the-first-quadrant/v/cosine-sine-and-tangent-of-6-and-3>

Sin, Cos, Tan for 45-45-90 (in radians):

<https://www.khanacademy.org/math/precalculus/x9e81a4f98389efdf:trig/x9e81a4f98389efdf:special-trigonometric-values-in-the-first-quadrant/v/solving-triangle-unit-circle>

Sine Graph: <https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:trig/x2ec2f6f830c9fb89:trig-graphs/v/we-graph-domain-and-range-of-sine-function>

Tangent Graph: <https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:trig/x2ec2f6f830c9fb89:trig-graphs/v/tangent-graph>

Cosine Graph: <https://www.youtube.com/watch?v=2OyoueyPRLg&t=15s>

ASTC, Trigonometric Values being Positive or Negative: <https://www.youtube.com/watch?v=IQ5TuVdtKNU>

Pythagorean Identity:

<https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:trig/x2ec2f6f830c9fb89:pythagorean-id/v/using-the-pythagorean-trig-identity>

Pythagorean Theorem: <https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-geometry/cc-8th-pythagorean-theorem/v/pythagorean-theorem-2>

Reference Angles: <https://www.youtube.com/watch?v=V8LEHEzdU2U>