ALEKS®

Algebra 1

Correlation of the ALEKS course Algebra 1 to the Common Core State Standards for High School Algebra 1

Number and Quantity

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ALEKS course topic that addresses the standard

N-RN: The Real Number System

N-RN.1: Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.

- Converting between radical form and exponent form

N-RN.2: Rewrite expressions involving radicals and rational exponents using the properties of exponents.

- Simplifying the square root of a whole number less than 100
- Simplifying the square root of a whole number greater than 100
- Rational exponents: Unit fraction exponents and whole number bases
- Rational exponents: Unit fraction exponents and bases involving signs
- Rational exponents: Non-unit fraction exponent with a whole number base
- Rational exponents: Negative exponents and fractional bases
- Rational exponents: Product rule
- Rational exponents: Quotient rule
- Rational exponents: Products and quotients with negative exponents
- Rational exponents: Power of a power rule
- Rational exponents: Powers of powers with negative exponents
- Introduction to simplifying a radical expression with an even exponent
- Square root of a perfect square monomial
- Using absolute value to simplify square roots of perfect square monomials
- Finding the nth root of a perfect n^{th} power monomial
- Simplifying a radical expression with an even exponent
- Introduction to simplifying a radical expression with an odd exponent
- Simplifying a radical expression with an odd exponent
- Simplifying a radical expression with two variables
- Simplifying a higher root of a whole number
- Introduction to simplifying a higher radical expression
- Simplifying a higher radical expression: Univariate
- Simplifying a higher radical expression: Multivariate Square
- root addition or subtraction
- Square root addition or subtraction with three terms
- Introduction to simplifying a sum or difference of radical expressions: Univariate
- Simplifying a sum or difference of radical expressions: Univariate

Simplifying a sum or difference of radical expressions: Multivariate

- Square root multiplication: Basic
- Square root multiplication: Advanced
- Introduction to simplifying a product of radical expressions: Univariate
- Simplifying a product of radical expressions: Univariate
- Simplifying a product of radical expressions: Multivariate
- Introduction to simplifying a product of higher roots
- Simplifying a product of higher radical expressions
- Simplifying a product involving square roots using the distributive property: Basic
- Simplifying a product involving square roots using the distributive property: Advanced
- Special products of radical expressions: Conjugates and squaring
- Simplifying a quotient involving a sum or difference with a square root
- Rationalizing a denominator: Quotient involving square roots
- Rationalizing a denominator: Square root of a fraction
- Rationalizing a denominator: Quotient involving a monomial
- Rationalizing a denominator using conjugates: Integer numerator
- Rationalizing a denominator using conjugates: Square root in numerator

N-RN.3: Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

- Classifying sums and products as rational or irrational

N-Q: Quantities*
N-Q.1: Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

- Finding a unit price
- Computing unit prices to find the better buy
- Word problem on unit rates associated with ratios of whole numbers: Decimal answers
- U.S. Customary length conversion with whole number values
- Converting between metric and U.S. Customary unit systems
- Converting between temperatures in Fahrenheit and Celsius
- Word problem involving the area between two rectangles
- Perimeter involving rectangles and circles
- Area involving rectangles and circles
- Word problem involving the volume of a rectangular prism
- Word problem involving the rate of filling or emptying a rectangular prism
- Word problem involving the volume of a cylinder
- Word problem involving the rate of filling or emptying a cylinder
- Solving a word problem involving rates and time conversion
- Solving a one-step word problem using the formula d = rt
- Solving a distance, rate, time problem using a linear equation
- Converting between compound units: Basic
- Word problem involving U.S. Customary length conversions using dimensional analysis
- Converting between compound units: Advanced
- Interpreting direct variation from a graph
- Finding the intercepts and rate of change given a graph of a linear function Finding the initial amount and rate of change given a table for a linear function

N-Q.2: Define appropriate quantities for the purpose of descriptive modeling.

- Writing a one-step expression for a real-world situation
- Translating a phrase into a one-step expression

- Translating a phrase into a two-step expression
- Translating a sentence into a one-step equation
- Writing an equation to represent a proportional relationship
- Translating a sentence into a multi-step equation
- Writing an equation of the form Ax + B = C to solve a word problem
- Writing an equation of the form A(x + B) = C to solve a word problem
- Writing an equation to represent a real-world problem: Variable on both sides
- Writing and solving a real-world problem given an equation with the variable on both sides
- Writing a multi-step equation for a real-world situation
- Translating a sentence by using an inequality symbol
- Translating a sentence into a one-step inequality
- Writing an inequality for a real-world situation
- Translating a sentence into a multi-step inequality
- Translating a sentence into a compound inequality
- Writing and evaluating a function that models a real-world situation: Basic
- Writing and evaluating a function that models a real-world situation: Advanced
- Writing an equation and drawing its graph to model a real-world situation: Basic
- Writing an equation and drawing its graph to model a real-world situation: Advanced
- Interpreting the parameters of a linear function that models a real-world situation
- Writing a linear inequality in two variables given a table of values
- Writing a multi-step inequality for a real-world situation

Writing an equation that models exponential growth or decay

N-Q.3: Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
- Finding the absolute error and percent error of a measurement

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Algebra

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A-SSE: Seeing Structure in Expressions

A-SSE.1: Interpret expressions that represent a quantity in terms of its context.*

A-SSE.1.a: Interpret parts of an expression, such as terms, factors, and coefficients.
- Identifying parts in an algebraic expression
- Writing a one-step expression for a real-world situation
- Translating a phrase into a two-step expression
- Translating a sentence into a one-step equation
- Writing an equation to represent a proportional relationship
- Translating a sentence into a multi-step equation
- How the leading coefficient affects the shape of a parabola
- Degree and leading coefficient of a univariate polynomial
- Rewriting a quadratic function to find its vertex and sketch its graph Classifying the graph of a function

A-SSE.1.b: Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.
- Identifying parts in an algebraic expression
- Identifying equivalent algebraic expressions
- Finding the slope and y-intercept of a line given its equation in the form y = mx + b

- Finding the slope and y-intercept of a line given its equation in the form Ax + By = C
- Interpreting the parameters of a linear function that models a real-world situation
- Finding the initial amount and rate of change given an exponential function
- Rewriting a quadratic function to find its vertex and sketch its graph

A-SSE.2: Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.

- Factoring out a monomial from a polynomial: Univariate
- Factoring out a monomial from a polynomial: Multivariate
- Factoring out a binomial from a polynomial: GCF factoring, basic
- Factoring a univariate polynomial by grouping: Problem type 1
- Factoring a univariate polynomial by grouping: Problem type 2
- Factoring a multivariate polynomial by grouping: Problem type 1
- Factoring a multivariate polynomial by grouping: Problem type 2
- Factoring a quadratic with leading coefficient 1
- Factoring a quadratic in two variables with leading coefficient 1
- Factoring out a constant before factoring a quadratic
- Factoring a quadratic with leading coefficient greater than 1: Problem type 1
- Factoring a quadratic with leading coefficient greater than 1: Problem type 2
- Factoring a quadratic with leading coefficient greater than 1: Problem type 3
- Factoring a quadratic by the ac-method
- Factoring a quadratic in two variables with leading coefficient greater than 1
- Factoring a quadratic with a negative leading coefficient
- Factoring a perfect square trinomial with leading coefficient 1
- Factoring a perfect square trinomial with leading coefficient greater than 1
- Factoring a perfect square trinomial in two variables
- Factoring a difference of squares in one variable: Basic
- Factoring a difference of squares in one variable: Advanced
- Factoring a difference of squares in two variables
- Factoring a polynomial involving a GCF and a difference of squares: Univariate
- Factoring a polynomial involving a GCF and a difference of squares: Multivariate
- Factoring a product of a quadratic trinomial and a monomial
- Factoring with repeated use of the difference of squares formula Factoring a sum or difference of two cubes

A-SSE.3: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*

  A-SSE.3.a: Factor a quadratic expression to reveal the zeros of the function it defines.

- Finding the roots of a quadratic equation of the form $ax^2 + bx = 0$
- Finding the roots of a quadratic equation with leading coefficient 1
- Finding the roots of a quadratic equation with leading coefficient greater than 1
- Finding the zeros of a quadratic function given its equation
- Finding the x-intercept(s) and the vertex of a parabola

  A-SSE.3.b: Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

- Completing the square
- Rewriting a quadratic function to find its vertex and sketch its graph
- Finding the maximum or minimum of a quadratic function

  A-SSE.3.c: Use the properties of exponents to transform expressions for exponential functions. For

example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.

- Understanding the product rule of exponents
- Introduction to the product rule of exponents
- Product rule with positive exponents: Univariate
- Product rule with positive exponents: Multivariate
- Ordering numbers with positive exponents
- Understanding the power rules of exponents
- Introduction to the power of a power rule of exponents
- Introduction to the power of a product rule of exponents
- Power rules with positive exponents: Multivariate products
- Power rules with positive exponents: Multivariate products
- Power rules with positive exponents: Multivariate quotients
- Power and product rules with positive exponents
- Simplifying a ratio of multivariate monomials: Basic
- Introduction to the quotient rule of exponents
- Simplifying a ratio of univariate monomials
- Quotient of expressions involving exponents
- Simplifying a ratio of multivariate monomials: Advanced
- Power and quotient rules with positive exponents
- Evaluating expressions with exponents of zero
- Power of 10: Negative exponent
- Evaluating an expression with a negative exponent: Whole number base
- Evaluating an expression with a negative exponent: Positive fraction base
- Evaluating an expression with a negative exponent: Negative integer base
- Ordering numbers with negative exponents
- Rewriting an algebraic expression without a negative exponent
- Introduction to the product rule with negative exponents
- Product rule with negative exponents
- Quotient rule with negative exponents: Problem type 1
- Quotient rule with negative exponents: Problem type 2
- Power of a power rule with negative exponents
- Power rules with negative exponents
- Power and quotient rules with negative exponents: Problem type 1
- Power and quotient rules with negative exponents: Problem type 2
- Power, product, and quotient rules with negative exponents

A-APR: Arithmetic with Polynomials and Rational Expressions

A-APR.1: Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

- Combining like terms: Whole number coefficients
- Combining like terms: Integer coefficients
- Combining like terms: Fractional coefficients
- Combining like terms: Decimal coefficients
- Using distribution and combining like terms to simplify: Univariate
- Using distribution with double negation and combining like terms to simplify: Multivariate
- Combining like terms in a quadratic expression
- Simplifying a sum or difference of two univariate polynomials
- Simplifying a sum or difference of three univariate polynomials
- Multiplying binomials with leading coefficients of 1

- Multiplying binomials with leading coefficients greater than 1
- Multiplying binomials in two variables
- Multiplying conjugate binomials: Univariate
- Multiplying conjugate binomials: Multivariate
- Squaring a binomial: Univariate
- Squaring a binomial: Multivariate
- Multiplying binomials with negative coefficients
- Multiplication involving binomials and trinomials in one variable
- Multiplication involving binomials and trinomials in two variables
- Closure properties of integers and polynomials

A-CED: Creating Equations*

A-CED.1: Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

- Translating a sentence into a one-step equation
- Writing an equation to represent a proportional relationship
- Translating a sentence into a multi-step equation
- Solving a fraction word problem using a linear equation of the form Ax = B
- Writing an equation of the form Ax + B = C to solve a word problem
- Solving a decimal word problem using a linear equation of the form Ax + B = C
- Writing an equation of the form A(x + B) = C to solve a word problem
- Solving a word problem with two unknowns using a linear equation
- Writing an equation to represent a real-world problem: Variable on both sides
- Writing a multi-step equation for a real-world situation
- Solving a decimal word problem using a linear equation with the variable on both sides
- Solving a fraction word problem using a linear equation with the variable on both sides
- Solving a word problem with three unknowns using a linear equation
- Solving a word problem involving consecutive integers
- Solving a value mixture problem using a linear equation
- Solving a word problem involving rates and time conversion
- Solving a one-step word problem using the formula d = rt
- Solving a distance, rate, time problem using a linear equation
- Finding side lengths of rectangles given one dimension and an area or a perimeter
- Finding the dimensions of a rectangle given its perimeter and a relationship between sides
- Finding the perimeter or area of a rectangle given one of these values
- Finding a side length given the perimeter and side lengths with variables
- Writing an equation to find angle measures of a triangle given angles with variables
- Word problem on proportions: Problem type 1
- Word problem on proportions: Problem type 2
- Solving a percent mixture problem using a linear equation
- Translating a sentence by using an inequality symbol
- Translating a sentence into a one-step inequality
- Writing an inequality for a real-world situation
- Writing an inequality given a graph on the number line
- Translating a sentence into a multi-step inequality
- Solving a word problem using a two-step linear inequality
- Solving a decimal word problem using a two-step linear inequality
- Solving a decimal word problem using a linear inequality with the variable on both sides
- Translating a sentence into a compound inequality
- Writing a compound inequality given a graph on the number line

- Word problem on direct variation
- Finding inputs and outputs of a two-step function that models a real-world situation: Function notation
- Finding a final amount in a word problem on exponential growth or decay
- Finding the final amount in a word problem on compound interest
- Finding the future value and interest for a compound interest loan or investment
- Finding the present value of a compound interest investment
- Solving a word problem using a quadratic equation with rational roots
- Solving a word problem using a quadratic equation with irrational roots

A-CED.2: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

- Writing an equation to represent a proportional relationship
- Graphing a linear equation of the form y = mx
- Graphing a line given its equation in slope-intercept form: Integer slope
- Graphing a line given its equation in slope-intercept form: Fractional slope
- Graphing a line given its equation in standard form
- Graphing a vertical or horizontal line
- Graphing a line by first finding its x- and y-intercepts
- Writing a direct variation equation
- Graphing a line by first finding its slope and y-intercept
- Writing an equation of a line given its slope and y-intercept
- Writing an equation and graphing a line given its slope and y-intercept
- Finding the slope, y-intercept, and equation for a linear function given a table of values
- Writing an equation in slope-intercept form given the slope and a point
- Graphing a line given its equation in point-slope form
- Writing an equation in point-slope form given the slope and a point
- Writing an equation in standard form given the slope and a point
- Writing an equation of a line given the y-intercept and another point
- Writing the equation of the line through two given points
- Writing and evaluating a function that models a real-world situation: Basic
- Writing and evaluating a function that models a real-world situation: Advanced
- Writing an equation and drawing its graph to model a real-world situation: Basic
- Writing an equation and drawing its graph to model a real-world situation: Advanced

- Graphing a parabola of the form $y = ax^2$

- Graphing a parabola of the form $y = ax^2 + c$

- Graphing a parabola of the form $y = (x-h)^2 + k$

- Graphing an exponential function: $f(x) = a^x$

- Graphing an exponential function: $f(x) = a(b)^x$

- Writing an equation that models exponential growth or decay
- Writing an exponential function rule given a table of ordered pairs

- Graphing a parabola of the form $y = a(x-h)^2 + k$

- Graphing a parabola of the form $y = x^2 + bx + c$

- Graphing a parabola of the form $y = ax^2 + bx + c$: Integer coefficients

- Graphing a parabola of the form $y = ax^2 + bx + c$: Rational coefficients

Writing a quadratic function given its zeros
Rewriting a quadratic function to find its vertex and sketch its graph
Writing the equation of a quadratic function given its graph

A-CED.3: Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

- Writing an equation of the form Ax + B = C to solve a word problem
- Writing an equation to represent a real-world problem: Variable on both sides
- Writing a multi-step equation for a real-world situation
- Solving a word problem with three unknowns using a linear equation
- Finding side lengths of rectangles given one dimension and an area or a perimeter
- Finding the dimensions of a rectangle given its perimeter and a relationship between sides
- Finding the perimeter or area of a rectangle given one of these values
- Writing an inequality given a graph on the number line
- Solving a word problem using a two-step linear inequality
- Solving a decimal word problem using a two-step linear inequality
- Solving a decimal word problem using a linear inequality with the variable on both sides Solving a word problem involving a sum and another basic relationship using a system of linear equations
- Solving a word problem using a system of linear equations of the form Ax + By = C
- Writing and solving a system of two linear equations given a table of values
- Solving a word problem using a system of linear equations of the form y = mx + b
- Solving a value mixture problem using a system of linear equations
- Solving a percent mixture problem using a system of linear equations
- Solving a distance, rate, time problem using a system of linear equations
- Solving a tax rate or interest rate problem using a system of linear equations
- Solving a word problem using a 3x3 system of linear equations: Problem type 1
- Writing a linear inequality in two variables given a table of values
- Writing a multi-step inequality for a real-world situation
- Solving a word problem using a system of linear inequalities: Problem type 1

A-CED.4: Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.

- Solving for a variable in terms of other variables using addition or subtraction: Basic
- Solving for a variable in terms of other variables using addition or subtraction: Advanced
- Solving for a variable in terms of other variables using multiplication or division: Basic
- Solving for a variable in terms of other variables using multiplication or division: Advanced
- Solving for a variable in terms of other variables using addition or subtraction with division
- Solving for a variable inside parentheses in terms of other variables
- Solving for a variable in terms of other variables in a linear equation with fractions

A-REI: Reasoning with Equations and Inequalities

A-REI.1: Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

- Identifying properties used to solve a linear equation

A-REI.3: Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

- Additive property of equality with whole numbers
- Additive property of equality with fractions and mixed numbers
- Additive property of equality with decimals
- Additive property of equality with integers

Additive	property of equality with signed fractions
Multiplicative	property of equality with whole numbers
Multiplicative	property of equality with whole numbers: Fractional answers
Multiplicative	property of equality with fractions
Multiplicative	property of equality with decimals
Multiplicative	property of equality with integers
Multiplicative	property of equality with signed fractions
Using two steps	to solve an equation with whole numbers
Additive	property of equality with a negative coefficient
Solving a two-	step equation with integers
Introduction to	solving an equation with parentheses
Solving a multi-	step equation given in fractional form
Solving a two-	step equation with signed decimals
Introduction to	solving an equation with variables on the same side
Solving a linear	equation with several occurrences of the variable: Variables on the same side
Introduction to	solving a linear equation with a variable on each side
Solving a linear	equation with several occurrences of the variable: Variables on both sides
Solving a linear and distribution	equation with several occurrences of the variable: Variables on the same side
Solving a linear distribution	equation with several occurrences of the variable: Variables on both sides and
Solving a linear two	equation with several occurrences of the variable: Variables on both sides and distributions
Solving a linear monomial	equation with several occurrences of the variable: Fractional forms with numerators
Solving a two-	step equation with signed fractions
Solving a linear fractional	equation with several occurrences of the variable: Variables on both sides and coefficients
Solving a linear binomial	equation with several occurrences of the variable: Fractional forms with numerators
Solving	equations with zero, one, or infinitely many solutions
Solving for a	variable in terms of other variables using addition or subtraction: Basic
Solving for a	variable in terms of other variables using addition or subtraction: Advanced
Solving for a	variable in terms of other variables using multiplication or division: Basic
Solving for a	variable in terms of other variables using multiplication or division: Advanced
Solving for a	variable in terms of other variables using addition or subtraction with division
Solving for a	variable inside parentheses in terms of other variables
Solving for a	variable in terms of other variables in a linear equation with fractions
Solving a	proportion of the form x/a=b/c: Basic
Solving a	proportion of the form x/a = b/c
Solving a	proportion of the form (x+a)/b = c/d
Solving a	proportion of the form a/(x+b) = c/x
Additive	property of inequality with whole numbers
Additive	property of inequality with integers
Additive	property of inequality with signed fractions
Additive	property of inequality with signed decimals
Multiplicative	property of inequality with whole numbers
Multiplicative	property of inequality with integers
Multiplicative	property of inequality with signed fractions
Solving a two-	step linear inequality with whole numbers

Solving a two-step linear inequality: Problem type 1

- Solving a two-step linear inequality: Problem type 2
- Solving a two-step linear inequality with a fractional coefficient
- Solving a linear inequality with multiple occurrences of the variable: Problem type 1
- Solving a linear inequality with multiple occurrences of the variable: Problem type 2
- Solving a linear inequality with multiple occurrences of the variable: Problem type 3
- Solving inequalities with no solution or all real numbers as solutions
- Solving a compound linear inequality: Graph solution, basic Solving a
compound linear inequality: Graph solution, advanced A-REI.4: Solve quadratic equations in
one variable.

A-REI.4.a: Use the method of completing the square to transform any quadratic equation in x into an

equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.

- Solving a quadratic equation by completing the square: Decimal answers

A-REI.4.b: Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.

- Finding the roots of a quadratic equation of the form $ax^2 + bx = 0$
- Finding the roots of a quadratic equation with leading coefficient 1
- Finding the roots of a quadratic equation with leading coefficient greater than 1 Solving a quadratic equation needing simplification
- Solving an equation of the form $x^2 = a$ using the square root property
- Solving a quadratic equation using the square root property: Decimal answers, basic
- Solving a quadratic equation using the square root property: Decimal answers, advanced
- Solving a quadratic equation by completing the square: Decimal answers Applying the quadratic formula: Decimal answers

A-REI.5: Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. • Identifying the operations used to create equivalent systems of equations

A-REI.6: Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

- Identifying the solution of systems of linear equations from graphs
- Classifying systems of linear equations from graphs
- Graphically solving a system of linear equations both of the form y=mx+b
- Graphically solving a system of linear equations
- Solving a system of linear equations of the form y = mx + b
- Solving a system of linear equations using substitution
- Solving a system of linear equations using elimination with addition
- Solving a system of linear equations using elimination with multiplication and addition
- Solving a system of linear equations with fractional coefficients
- Solving a system of linear equations with decimal coefficients
- Solving systems of linear equations with 0, 1, or infinitely many solutions Interpreting the graphs of two functions

A-REI.7: Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line y = -3x and the circle $x^2 + y^2 = 3$.

- Graphically solving a system of linear and quadratic equations
- Solving a system of linear and quadratic equations

A-REI.10: Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

- Identifying solutions to a linear equation in two variables
- Graphing a linear equation of the form y = mx
- Graphing a line given its equation in slope-intercept form: Integer slope
- Graphing a line given its equation in slope-intercept form: Fractional slope
- Graphing a line given its equation in standard form
- Graphing an integer function and finding its range for a given domain
- Graphing an exponential function: $f(x) = a^x$
- Graphing an exponential function: $f(x) = a(b)^x$

A-REI.11: Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.*

- Solving a linear equation by graphing
- Using a graphing calculator to solve a system of linear equations: Basic
- Using a graphing calculator to solve a system of linear equations: Advanced

A-REI.12: Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

- Graphing a linear inequality in the plane: Vertical or horizontal line
- Graphing a linear inequality in the plane: Slope-intercept form
- Graphing a linear inequality in the plane: Standard form
- Graphing a system of two linear inequalities: Basic
- Graphing a system of two linear inequalities: Advanced
- Graphing a system of three linear inequalities

Functions

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ALEKS course topic that addresses the standard

F-IF: Interpreting Functions

F-IF.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).

- Identifying functions from relations
- Vertical line test
- Domain and range from ordered pairs
- Finding an output of a function from its graph

F-IF.2: Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

- Table for a linear function

- Finding outputs of a one-step function that models a real-world situation: Function notation Finding outputs of a two-step function with decimals that models a real-world situation: Function notation
- Graphing an integer function and finding its range for a given domain
- Table for an exponential function
- Evaluating an exponential function that models a real-world situation

F-IF.3: Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1.

- Finding the first terms of an arithmetic sequence using an explicit rule
- Finding the next terms of an arithmetic sequence with whole numbers
- Finding the next terms of an arithmetic sequence with integers
- Finding the first terms of a sequence using a recursive rule
- Finding the first terms of a geometric sequence using an explicit rule
- Finding the next terms of a geometric sequence with whole numbers
- Finding the next terms of a geometric sequence with signed numbers

F-IF.4: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*

- Finding x- and y-intercepts given the graph of a line on a grid
- Interpreting direct variation from a graph
- Writing an equation and drawing its graph to model a real-world situation: Basic
- Writing an equation and drawing its graph to model a real-world situation: Advanced
- Finding the intercepts and rate of change given a graph of a linear function
- Finding the initial amount and rate of change given a table for a linear function
- Comparing properties of linear functions given in different forms
- Finding where a function is increasing, decreasing, or constant given the graph
- Choosing a graph to fit a narrative: Basic
- Choosing a graph to fit a narrative: Advanced
- Comparing linear, polynomial, and exponential functions
- Finding the vertex, intercepts, and axis of symmetry from the graph of a parabola
- Finding the maximum or minimum of a quadratic function
- Word problem involving the maximum or minimum of a quadratic function
- Comparing properties of quadratic functions given in different forms
Solving a word problem using a quadratic equation with irrational roots

F-IF.5: Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*

- Domain and range from ordered pairs
- Domain and range of a linear function that models a real-world situation
- Finding domain and range from a linear graph in context
- Graphing an integer function and finding its range for a given domain
- Finding domain and range from the graph of an exponential function Domain and range from the graph of a parabola

F-IF.6:

Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.*

- Finding slope given the graph of a line in quadrant 1 that models a real-world situation
- Finding slope given the graph of a line on a grid
- Finding slope given two points on the line
- Finding the intercepts and rate of change given a graph of a linear function
- Finding the initial amount and rate of change given a table for a linear function
- Finding the average rate of change of a function given its equation
- Finding the average rate of change of a function given its graph
- Word problem involving average rate of change

F-IF.7: Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*

F-IF.7.a: Graph linear and quadratic functions and show intercepts, maxima, and minima.

- Graphing a linear equation of the form y = mx
- Graphing a line given its equation in slope-intercept form: Integer slope
- Graphing a line given its equation in slope-intercept form: Fractional slope
- Graphing a line given its equation in standard form
- Graphing a vertical or horizontal line
- Finding x- and y-intercepts given the graph of a line on a grid
- Finding x- and y-intercepts of a line given the equation: Basic
- Finding x- and y-intercepts of a line given the equation: Advanced
- Graphing a line given its x- and y-intercepts
- Graphing a line by first finding its x- and y-intercepts
- Graphing a line by first finding its slope and y-intercept
- Graphing a parabola of the form $y = ax^2$
- Graphing a parabola of the form $y = ax^2 + c$
- Graphing a parabola of the form $y = (x-h)^2 + k$
- Finding the vertex, intercepts, and axis of symmetry from the graph of a parabola
- Graphing a parabola of the form $y = a(x-h)^2 + k$
- Graphing a parabola of the form $y = x^2 + bx + c$
- Graphing a parabola of the form $y = ax^2 + bx + c$: Integer coefficients
- Graphing a parabola of the form $y = ax^2 + bx + c$: Rational coefficients
- Finding the x-intercept(s) and the vertex of a parabola

Using a graphing calculator to find the x-intercept(s) and vertex of a quadratic function
Rewriting a quadratic function to find its vertex and sketch its graph Solving a quadratic equation by graphing

F-IF.7.b: Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

- Graphing an absolute value equation of the form y = A|x|
- Graphing an absolute value equation in the plane: Basic
- Graphing an absolute value equation in the plane: Advanced
- Graphing a piecewise-defined function: Problem type 1
- Graphing a piecewise-defined function: Problem type 2

F-IF.7.e: Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

- Graphing an exponential function: $f(x) = a^x$
- Graphing an exponential function: $f(x) = a(b)^x$

F-IF.8:   Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

    F-IF.8.a: Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.

- Finding the zeros of a quadratic function given its equation
- Finding the x-intercept(s) and the vertex of a parabola
- Rewriting a quadratic function to find its vertex and sketch its graph
- Finding the maximum or minimum of a quadratic function
- Word problem involving the maximum or minimum of a quadratic function

    F-IF.8.b: Use the properties of exponents to interpret expressions for exponential functions. For

example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y =$

$(1.2)^{t/10}$, and classify them as representing exponential growth or decay.

- Finding the initial amount and rate of change given an exponential function
- Writing an equation that models exponential growth or decay

F-IF.9:   Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

- Comparing properties of linear functions given in different forms
- Comparing properties of quadratic functions given in different forms

F-BF: Building Functions

F-BF.1:   Write a function that describes a relationship between two quantities.*

    F-BF.1.a: Determine an explicit expression, a recursive process, or steps for calculation from a context.

- Writing a function rule given a table of ordered pairs: One-step rules Writing a
- function rule given a table of ordered pairs: Two-step rules
- Writing and evaluating a function that models a real-world situation: Basic
- Writing and evaluating a function that models a real-world situation: Advanced
- Writing an equation and drawing its graph to model a real-world situation: Basic
- Writing an equation and drawing its graph to model a real-world situation: Advanced
- Writing an equation that models exponential growth or decay
- Writing an exponential function rule given a table of ordered pairs Writing
- a   quadratic function given its zeros

    F-BF.1.b: Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.

- Combining functions to write a new function that models a real-world situation

F-BF.2:   Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.*

- Writing an explicit rule for an arithmetic sequence
- Writing a recursive rule for an arithmetic sequence
- Arithmetic and geometric sequences: Identifying and writing an explicit rule
- Writing recursive rules for arithmetic and geometric sequences

F-BF.3:   Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

- Comparing linear functions to the parent function y=x
- Translating the graph of a parabola: One step
- Translating the graph of a parabola: Two steps
- How the leading coefficient affects the shape of a parabola
- Graphing quadratic functions of the form $y=ax^2$ and $y=(bx)^2$ by transforming the parent graph $y=x^2$
- Translating the graph of an absolute value function: One step
- Translating the graph of an absolute value function: Two steps
- How the leading coefficient affects the graph of an absolute value function Writing an equation for a function after a vertical translation
- Writing an equation for a function after a vertical and horizontal translation Translating the graph of an exponential function F-BF.4:   Find inverse functions.

F-BF.4.a: Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, f(x) = $2x^3$ or f(x) = (x+1)/(x-1) for x ≠ 1.

- Inverse functions: Linear, discrete
- Finding, evaluating, and interpreting an inverse function for a given linear relationship

F-LE: Linear, Quadratic, and Exponential Models*

F-LE.1:   Distinguish between situations that can be modeled with linear functions and with exponential functions.

F-LE.1.a: Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.

- Identifying linear functions given ordered pairs
- Writing an exponential function rule given a table of ordered pairs
- Identifying linear, quadratic, and exponential functions given ordered pairs

F-LE.1.b: Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

- Identifying linear functions given ordered pairs
- Writing and evaluating a function that models a real-world situation: Basic
- Writing and evaluating a function that models a real-world situation: Advanced
- Writing an equation and drawing its graph to model a real-world situation: Basic
- Writing an equation and drawing its graph to model a real-world situation: Advanced
- Finding the intercepts and rate of change given a graph of a linear function
- Finding the initial amount and rate of change given a table for a linear function
- Comparing properties of linear functions given in different forms
- Interpreting the parameters of a linear function that models a real-world situation
- Application problem with a linear function: Finding a coordinate given the slope and a point
- Application problem with a linear function: Finding a coordinate given two points
- Finding the next terms of an arithmetic sequence with whole numbers
- Finding the next terms of an arithmetic sequence with integers
- Identifying arithmetic sequences and finding the common difference
- Finding a specified term of an arithmetic sequence given the first terms
  Finding a specified term of an arithmetic sequence given the common difference and first term
- Writing an explicit rule for an arithmetic sequence

F-LE.1.c: Recognize situations in which a quantity grows or decays by a constant percent rate per unit

interval relative to another.
- Finding a final amount in a word problem on exponential growth or decay
- Finding the initial amount and rate of change given an exponential function
- Writing an equation that models exponential growth or decay
- Writing an exponential function rule given a table of ordered pairs
- Finding the next terms of a geometric sequence with whole numbers
- Finding the next terms of a geometric sequence with signed numbers
- Identifying arithmetic and geometric sequences
- Identifying geometric sequences and finding the common ratio
- Finding a specified term of a geometric sequence given the first terms
- Finding a specified term of a geometric sequence given the common ratio and first term
- Arithmetic and geometric sequences: Identifying and writing an explicit rule

Identifying linear, quadratic, and exponential functions given ordered pairs

F-LE.2:   Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
- Writing a function rule given a table of ordered pairs: One-step rules Writing a
- function rule given a table of ordered pairs: Two-step rules
- Writing an equation and graphing a line given its slope and y-intercept
- Finding the slope, y-intercept, and equation for a linear function given a table of values
- Writing an equation in slope-intercept form given the slope and a point
- Writing an equation in point-slope form given the slope and a point
- Writing an equation of a line given the y-intercept and another point
- Writing the equation of the line through two given points
- Writing equations of lines parallel and perpendicular to a given line through a point
- Writing and evaluating a function that models a real-world situation: Basic
- Writing and evaluating a function that models a real-world situation: Advanced
- Writing an equation and drawing its graph to model a real-world situation: Basic
- Writing an equation and drawing its graph to model a real-world situation: Advanced
- Writing an explicit rule for an arithmetic sequence
- Writing an equation that models exponential growth or decay
- Writing an exponential function rule given a table of ordered pairs

Arithmetic and geometric sequences: Identifying and writing an explicit rule

F-LE.3:   Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. ● Comparing linear, polynomial, and exponential functions

F-LE.5:   Interpret the parameters in a linear or exponential function in terms of a context.
- Interpreting the parameters of a linear function that models a real-world situation
- Evaluating an exponential function that models a real-world situation
- Finding the initial amount and rate of change given an exponential function

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Statistics and Probability

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ALEKS course topic that addresses the standard

S-ID: Interpreting Categorical and Quantitative Data

S-ID.1:   Represent data with plots on the real number line (dot plots, histograms, and box plots). ● Constructing a line plot

- Constructing a frequency distribution and a histogram Constructing a
- box-and-whisker plot

S-ID.2: Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
- Comparing measures of center and variation
- Using back-to-back stem-and-leaf plots to compare data sets
- Using box-and-whisker plots to compare data sets

S-ID.3: Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
- How changing a value affects the mean and median
- Choosing the best measure to describe data

S-ID.5: Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.
- Constructing a two-way frequency table: Basic
- Constructing a two-way frequency table: Advanced
- Computing a percentage from a table of values
- Making an inference using a two-way frequency table
- Calculating relative frequencies in a contingency table

S-ID.6: Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

S-ID.6.a: Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.
- Sketching the line of best fit
- Scatter plots and correlation
- Predictions from the line of best fit
- Approximating the equation of a line of best fit and making predictions

S-ID.6.b: Informally assess the fit of a function by plotting and analyzing residuals.
- Computing residuals
- Interpreting residual plots

S-ID.6.c: Fit a linear function for a scatter plot that suggests a linear association.
- Sketching the line of best fit
- Approximating the equation of a line of best fit and making predictions

S-ID.7: Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
- Predictions from the line of best fit

S-ID.8: Compute (using technology) and interpret the correlation coefficient of a linear fit.
- Linear relationship and the correlation coefficient

S-ID.9: Distinguish between correlation and causation.
- Identifying correlation and causation

Standards for Mathematical Practices

- ALEKS course topic that addresses the standard   =

1: Make sense of problems and persevere in solving them.

- Greatest common factor of 2 numbers
- Least common multiple of 2 numbers
- Word problem with common multiples
- Fractional part of a circle
- Multi-step word problem involving fractions and multiplication Fraction
- division
- Using a common denominator to order fractions
- Ordering decimals
- Ordering fractions and decimals
- Word problem with addition of 3 or 4 decimals and whole numbers
- Word problem with subtraction of a whole number and a decimal: Regrouping with zeros
- Word problem with multiple decimal operations: Problem type 1
- Converting a fraction to a terminating decimal: Basic
- Converting a fraction to a terminating decimal: Advanced
- Converting a fraction to a repeating decimal: Basic
- Converting a fraction to a repeating decimal: Advanced
- Converting a decimal to a proper fraction in simplest form: Advanced
- Word problem on unit rates associated with ratios of whole numbers: Decimal answers
- Solving a word problem on proportions using a unit rate
- Operations with absolute value: Problem type 2
- Signed fraction multiplication: Basic
- Signed fraction multiplication: Advanced Order
- of operations with whole numbers
- Order of operations with whole numbers and grouping symbols
- Order of operations with whole numbers and exponents: Basic
- Order of operations with whole numbers and exponents: Advanced
- Order of operations with integers
- Order of operations with integers and exponents
- Converting between temperatures in Fahrenheit and Celsius
- Interpreting a Venn diagram of 3 sets
- Area of a piecewise rectangular figure
- Word problem involving the area between two rectangles
- Perimeter involving rectangles and circles
- Area involving rectangles and circles
- Word problem involving the area between two concentric circles
- Word problem involving the rate of filling or emptying a cylinder
- Surface area of a cube or a rectangular prism
- Surface area of a triangular prism
- Surface area of a cylinder: Exact answers in terms of pi
- Solving a fraction word problem using a linear equation of the form Ax = B
- Solving a decimal word problem using a linear equation of the form Ax + B = C
- Solving a word problem with two unknowns using a linear equation
- Solving a word problem involving rates and time conversion
- Solving a one-step word problem using the formula d = rt

Solving a distance, rate, time problem using a linear equation

Finding side lengths of rectangles given one dimension and an area or a perimeter

- Solving equations involving vertical angles
- Converting between compound units: Basic
- Converting between compound units: Advanced
- Word problem on proportions: Problem type 1
- Similar polygons
- Similar right triangles
- Indirect measurement
- Circumference ratios
- Finding the sale price without a calculator given the original price and percent discount
- Finding the original price given the sale price and percent discount
- Finding the percentage increase or decrease: Advanced
- Finding the absolute error and percent error of a measurement
- Finding simple interest without a calculator
- Interpreting a line graph
- Writing an equation and drawing its graph to model a real-world situation: Advanced
- Comparing properties of linear functions given in different forms
- Interpreting the parameters of a linear function that models a real-world situation Scatter
- plots and correlation
- Predictions from the line of best fit
- Solving a system of linear equations using substitution
- Solving a system of linear equations using elimination with multiplication and addition
  Solving a word problem involving a sum and another basic relationship using a system of
- linear equations
- Solving a value mixture problem using a system of linear equations
- Solving a percent mixture problem using a system of linear equations
- Solving a distance, rate, time problem using a system of linear equations
- Solving a tax rate or interest rate problem using a system of linear equations Estimating a
- square root
- Multiplying numbers written in scientific notation: Basic
- Dividing numbers written in scientific notation: Basic
- Finding the x-intercept(s) and the vertex of a parabola
- Pythagorean Theorem
- Distance between two points in the plane: Exact answers
- Introduction to expectation
- Computing a percentage from a table of values
- Finding if a question can be answered by the data
- Interpreting a circle graph or pie chart
- Computations from a circle graph
- Finding the value for a new score that will yield a given mean
- Rejecting unreasonable claims based on average statistics
- Mean and median of a data set
- Choosing the best measure to describe data
- Using back-to-back stem-and-leaf plots to compare data sets
- Constructing a box-and-whisker plot
- Probability involving one die or choosing from n distinct objects
- Probability involving choosing from objects that are not distinct
- Experimental and theoretical probability
  Outcomes and event probability

Probabilities   involving   two   dice   **2:   Reason**

abstractly and quantitatively.

- Equivalent fractions

Simplifying a	• fraction
Fractional part	• of a circle
Product of a	• unit fraction and a whole number
Fractional	• position on a number line
Solving a word	• problem on proportions using a unit rate
Writing a ratio	• as a percentage without a calculator
Plotting integers	• on a number line
Plotting rational	• numbers on a number line
Evaluating a	• linear expression: Integer multiplication with addition or subtraction
Evaluating a	• quadratic expression: Integers
Converting	• between temperatures in Fahrenheit and Celsius
Interpreting a	• Venn diagram of 3 sets
Additive	• property of equality with whole numbers
Additive	• property of equality with fractions and mixed numbers
Additive	• property of equality with decimals
Additive	• property of equality with integers
Multiplicative	• property of equality with whole numbers
Multiplicative	• property of equality with integers
Multiplicative	• property of equality with signed fractions
Additive	• property of equality with a negative coefficient
Solving a two-	• step equation with integers
Solving a two-	• step equation with signed decimals
Solving a linear and distribution	equation with several occurrences of the variable: Variables on the same side •
Solving a linear distribution	equation with several occurrences of the variable: Variables on both sides and •
Solving a linear two	equation with several occurrences of the variable: Variables on both sides and • distributions
Solving a two-	• step equation with signed fractions
Solving a linear fractional	equation with several occurrences of the variable: Variables on both sides and • coefficients
Translating a	• phrase into a one-step expression
Translating a	• phrase into a two-step expression
Translating a	• sentence into a one-step equation
Translating a	• sentence into a multi-step equation
Solving a	• fraction word problem using a linear equation of the form Ax = B
Writing a multi-	• step equation for a real-world situation
Solving	• equations involving vertical angles
Finding an angle	• measure of a triangle given two angles
Solving for a	• variable in terms of other variables using addition or subtraction: Basic
Solving for a	• variable in terms of other variables using multiplication or division: Basic
Converting	• between compound units: Basic
Converting	• between compound units: Advanced
Solving a	• proportion of the form a/(x+b) = c/x
Word problem	• on proportions: Problem type 1
Translating a	• sentence by using an inequality symbol
Translating a	• sentence into a one-step inequality
Writing an	• inequality for a real-world situation
Graphing a	• linear inequality on the number line
Translating a	• sentence into a multi-step inequality

Translating a sentence into a compound inequality

Writing a function rule given a table of ordered pairs: One-step rules

- Writing a function rule given a table of ordered pairs: Two-step rules Interpreting a
- line graph
- Interpreting direct variation from a graph
- Writing and evaluating a function that models a real-world situation: Advanced
- Writing an equation and drawing its graph to model a real-world situation: Advanced
- Comparing properties of linear functions given in different forms
- Interpreting the parameters of a linear function that models a real-world situation
- Scatter plots and correlation
- Predictions from the line of best fit
- Table for a linear function
- Choosing a graph to fit a narrative: Advanced
- Graphically solving a system of linear equations
- Solving a system of linear equations using substitution
- Solving a system of linear equations using elimination with multiplication and addition
- Solving systems of linear equations with 0, 1, or infinitely many solutions
- Writing a multi-step inequality for a real-world situation
- Writing an equation that models exponential growth or decay

- Finding the roots of a quadratic equation of the form $ax^2 + bx = 0$
- Finding the roots of a quadratic equation with leading coefficient 1
- Finding the roots of a quadratic equation with leading coefficient greater than 1 Finding
- the x-intercept(s) and the vertex of a parabola
- Pythagorean Theorem
- Distance between two points in the plane: Exact answers
- Constructing a line plot
- Constructing a frequency distribution and a histogram
- Interpreting a stem-and-leaf plot
- Finding the value for a new score that will yield a given mean
- Choosing the best measure to describe data
- Constructing a box-and-whisker plot
- Interpreting a tree diagram
- Introduction to the probability of an event
- Probability involving one die or choosing from n distinct objects
- Probability involving choosing from objects that are not distinct
- Experimental and theoretical probability

Outcomes and event probability Probabilities
involving two dice

3: Construct viable arguments and critique the reasoning of others.
- Prime numbers
- Identifying numbers as integers or non-integers
- Identifying numbers as rational or irrational
- Writing a function rule given a table of ordered pairs: One-step rules Writing a
- function rule given a table of ordered pairs: Two-step rules Vertical line test
- Choosing a graph to fit a narrative: Advanced
- Estimating a square root
- Classifying sums and products as rational or irrational

Finding the value for a new score that will yield a given mean Choosing the best
measure to describe data **4: Model with mathematics.**

Word problem • with common multiples
Fractional part • of a circle
Multi-step word • problem involving fractions and multiplication
Fractional • position on a number line
Word problem • with addition of 3 or 4 decimals and whole numbers
Word problem • with subtraction of a whole number and a decimal: Regrouping with zeros
Word problem • with multiple decimal operations: Problem type 1
Writing ratios • for real-world situations
Solving a word • problem on proportions using a unit rate
U.S. Customary • length conversion with whole number values
U.S. Customary • volume conversion with whole number values
U.S. Customary • weight conversions with whole number values
Metric distance • conversion with whole number values
Computing the • distance between two integers on a number line
Word problem • involving the area between two rectangles
Perimeter • involving rectangles and circles
Area involving • rectangles and circles
Word problem • involving the area between two concentric circles
Word problem • involving the rate of filling or emptying a cylinder
Solving a • fraction word problem using a linear equation of the form Ax = B
Solving a • decimal word problem using a linear equation of the form Ax + B = C
Solving a word • problem with two unknowns using a linear equation
Solving a word • problem involving rates and time conversion
Solving a one- • step word problem using the formula d = rt
Solving a • distance, rate, time problem using a linear equation
Finding side • lengths of rectangles given one dimension and an area or a perimeter
Word problem • on proportions: Problem type 1
Similar polygons •
Similar right • triangles
Indirect • measurement
Circumference • ratios
Finding the sale • price without a calculator given the original price and percent discount
Finding the • original price given the sale price and percent discount
Finding the • percentage increase or decrease: Advanced
Finding simple • interest without a calculator
Graphing a • linear inequality on the number line
Writing and • evaluating a function that models a real-world situation: Advanced
Writing an • equation and drawing its graph to model a real-world situation: Advanced
Interpreting the • parameters of a linear function that models a real-world situation Sketching
the line of best • fit
Choosing a • graph to fit a narrative: Advanced
Solving a word • problem involving a sum and another basic relationship using a system of linear
equations •
Solving a value • mixture problem using a system of linear equations
Solving a • percent mixture problem using a system of linear equations
Solving a • distance, rate, time problem using a system of linear equations
Solving a tax • rate or interest rate problem using a system of linear equations
Writing an • equation that models exponential growth or decay
Introduction to • expectation
Computing a • percentage from a table of values
Interpreting a circle graph or pie chart
Computations from a circle graph

- Finding the value for a new score that will yield a given mean
- Rejecting unreasonable claims based on average statistics
- Interpreting a tree diagram
- Introduction to the probability of an event

5: Use appropriate tools strategically.

- Fractional position on a number line
- Word problem on unit rates associated with ratios of whole numbers: Decimal answers
- Solving a word problem on proportions using a unit rate
- Plotting integers on a number line
- Plotting rational numbers on a number line
- Reading the temperature from a thermometer
- Word problem on proportions: Problem type 1
- Applying the percent equation: Problem type 1
- Applying the percent equation: Problem type 2
- Graphing a linear inequality on the number line
- Graphing a linear equation of the form y = mx
- Graphing a line given its equation in slope-intercept form: Integer slope Predictions from the line of best fit
- Graphing a parabola of the form $y = ax^2$
- Graphing a linear inequality in the plane: Slope-intercept form

6: Attend to precision.

- Addition or subtraction of fractions with different denominators
- Fraction multiplication
- Fraction division
- Mixed number addition with the same denominator and renaming
- Mixed number subtraction with the same denominator and renaming
- Addition of mixed numbers with different denominators and renaming
- Subtraction of mixed numbers with different denominators and renaming
- Mixed number multiplication
- Mixed number division
- Using a common denominator to order fractions
- Addition of aligned decimals
- Subtraction of aligned decimals
- Decimal subtraction: Basic
- Decimal subtraction: Advanced
- Estimating a sum of whole numbers: Problem type 2
- Multiplication of a decimal by a power of ten
- Multiplying a decimal by a whole number
- Decimal multiplication: Problem type 1
- Division of a decimal by a power of ten
- Division of a decimal by a whole number
- Division of a decimal by a 2-digit decimal
- Converting a fraction to a terminating decimal: Basic
- Converting a fraction to a terminating decimal: Advanced
- Converting a fraction to a repeating decimal: Basic
- Converting a fraction to a repeating decimal: Advanced
- Converting a decimal to a proper fraction in simplest form: Advanced
- Finding a percentage of a whole number without a calculator: Basic Square root of a perfect square

- Integer addition: Problem type 1
- Integer addition: Problem type 2
- Integer subtraction: Problem type 1
- Integer subtraction: Problem type 2
- Integer subtraction: Problem type 3
- Integer multiplication and division
- Signed fraction addition or subtraction: Basic
- Signed fraction addition or subtraction: Advanced
- Signed fraction multiplication: Basic
- Signed fraction multiplication: Advanced Signed
- decimal addition and subtraction
- Signed decimal addition and subtraction with 3 numbers
- Power of 10: Positive exponent
- Circumference and area of a circle
- Solving a word problem involving rates and time conversion
- Finding the absolute error and percent error of a measurement
- Power of 10: Negative exponent
- Evaluating an expression with a negative exponent: Positive fraction base
- Evaluating an expression with a negative exponent: Negative integer base Estimating a
- square root
- Cube root of an integer
- Rational exponents: Negative exponents and fractional bases
- Scientific notation with positive exponent
- Scientific notation with negative exponent
- Multiplying numbers written in scientific notation: Basic
- Dividing numbers written in scientific notation: Basic

Square root • addition or subtraction Square root

multiplication: Advanced **7: Look for and make use of**

structure.

- Operations with absolute value: Problem type 2
- Order of operations with whole numbers
- Order of operations with whole numbers and grouping symbols
- Order of operations with whole numbers and exponents: Basic
- Order of operations with whole numbers and exponents: Advanced
- Order of operations with integers
- Order of operations with integers and exponents
- Combining like terms: Whole number coefficients
- Properties of addition
- Combining like terms: Integer coefficients
- Understanding the distributive property
- Distributive property: Whole number coefficients
- Distributive property: Integer coefficients
- Properties of real numbers
- Using distribution and combining like terms to simplify: Univariate
- Using distribution with double negation and combining like terms to simplify: Multivariate
- Combining like terms in a quadratic expression
- Solving for a variable in terms of other variables using addition or subtraction: Basic
- Solving for a variable in terms of other variables using multiplication or division: Basic
- Factoring out a monomial from a polynomial: Univariate
- Factoring out a monomial from a polynomial: Multivariate

Factoring out a binomial from a polynomial: GCF factoring, basic

- Factoring a univariate polynomial by grouping: Problem type 2
- Factoring a multivariate polynomial by grouping: Problem type 1
- Factoring a multivariate polynomial by grouping: Problem type 2
- Factoring a quadratic with leading coefficient 1
- Factoring a quadratic in two variables with leading coefficient 1
- Factoring out a constant before factoring a quadratic
- Factoring a perfect square trinomial with leading coefficient 1
- Factoring a perfect square trinomial with leading coefficient greater than 1
- Factoring a perfect square trinomial in two variables
- Factoring a difference of squares in one variable: Basic
- Factoring a difference of squares in one variable: Advanced
- Factoring a difference of squares in two variables
- Factoring a polynomial involving a GCF and a difference of squares: Univariate
- Factoring with repeated use of the difference of squares formula

Simplifying a • product involving square roots using the distributive property: Advanced Special products of radical expressions: Conjugates and squaring **8: Look for and express regularity in repeated reasoning.**

- Greatest common factor of 2 numbers
- Least common multiple of 2 numbers
- Converting a fraction to a repeating decimal: Basic
- Converting a fraction to a repeating decimal: Advanced
- Power of 10: Positive exponent
- Writing a function rule given a table of ordered pairs: One-step rules Writing a function rule given a table of ordered pairs: Two-step rules
- Introduction to the product rule of exponents
- Power of 10: Negative exponent
- Scientific notation with positive exponent
- Scientific notation with negative exponent
- Multiplying numbers written in scientific notation: Basic

Dividing numbers written in scientific notation: Basic