

Even though Infinite Calculus supports some of the standards below, it is not included in the table because calculus topics are not part of the Common Core State Standards.

IPA = Infinite Pre-Algebra

IA1 = Infinite Algebra 1

IGE = Infinite Geometry

IA2 = Infinite Algebra 2

## High School - Number and Quantity (N)

IPA IA1 IGE IA2

### Extend the properties of exponents to rational exponents.

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

### Use properties of rational and irrational numbers.

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.				
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### Reason quantitatively and use units to solve problems.

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.	✓	✓	✓	✓
N-Q-2	Define appropriate quantities for the purpose of descriptive modeling.	✓	✓	✓	✓
N-Q-3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	✓			

### Perform arithmetic operations with complex numbers.

N-CN-1	Know there is a complex number $i$ such that $i^2 = -1$ , and every complex number has the form $a + bi$ with $a$ and $b$ real.				✓
N-CN-2	Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.				✓
N-CN-3	(+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.				✓

### Represent complex numbers and their operations on the complex plane.

N-CN-4	(+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.				✓
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		IPA	IA1	IGE	IA2
N-CN-5	(+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. For example, $(-1 + \sqrt{3}i)^3 = 8$ because $(-1 + \sqrt{3}i)$ has modulus 2 and argument $120^\circ$ .				
N-CN-6	(+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.				
<b>Use complex numbers in polynomial identities and equations.</b>					
N-CN-7	Solve quadratic equations with real coefficients that have complex solutions.				✓
N-CN-8	(+) Extend polynomial identities to the complex numbers. For example, rewrite $x^2 + 4$ as $(x + 2i)(x - 2i)$ .				✓
N-CN-9	(+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.				✓
<b>Represent and model with vector quantities.</b>					
N-VM-1	(+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., $v$ , $ v $ , $\ v\ $ , $v$ ).				
N-VM-2	(+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.				
N-VM-3	(+) Solve problems involving velocity and other quantities that can be represented by vectors.				
<b>Perform operations on vectors.</b>					
N-VM-4	(+) Add and subtract vectors				
N-VM-5	(+) Multiply a vector by a scalar.				
<b>Perform operations on matrices and use matrices in applications.</b>					
N-VM-6	(+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.				✓
N-VM-7	(+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.				✓
N-VM-8	(+) Add, subtract, and multiply matrices of appropriate dimensions.				✓
N-VM-9	(+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.				✓
N-VM-10	(+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.				✓
N-VM-11	(+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.				✓
N-VM-12	(+) Work with $2 \times 2$ matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.				

## High School - Algebra (A)

IPA IA1 IGE IA2

### Interpret the structure of expressions

A-SSE-1a	Interpret parts of an expression, such as terms, factors, and coefficients.	✓	✓	✓	✓
A-SSE-1b	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 $P$ .	✓	✓	✓	✓
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 $(x^2 - y^2)(x^2 + y^2)$ .	✓	✓	✓	✓

### Write expressions in equivalent forms to solve problems

A-SSE-3a	Factor a quadratic expression to reveal the zeros of the function it defines.		✓		✓
A-SSE-3b	Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.		✓		✓
A-SSE-3c	Use the properties of exponents to transform expressions for exponential functions. For example the expression $1.15^t$ can be rewritten as $(1.151/12)^{(12t)} \approx 1.01212^t$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.	✓	✓		✓
A-SSE-4	Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.				✓

### Perform arithmetic operations on polynomials

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.	✓	✓	✓	✓
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### Understand the relationship between zeros and factors of polynomials

A-APR-2	Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number $a$ , the remainder on division by $x - a$ is $p(a)$ , so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$ .				✓
A-APR-3	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.		✓		✓

### Use polynomial identities to solve problems

A-APR-4	Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.				
A-APR-5	(+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of $x$ and $y$ for a positive integer $n$ , where $x$ and $y$ are any numbers, with coefficients determined for example by Pascal's Triangle.				✓

<b>Rewrite rational expressions</b>		IPA	IA1	IGE	IA2
A-APR-6	Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$ , where $a(x)$ , $b(x)$ , $q(x)$ , and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$ , using inspection, long division, or, for the more complicated examples, a computer algebra system.		✓		✓
A-APR-7	(+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.		✓		✓

<b>Create equations that describe numbers or relationships</b>					
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.	✓	✓	✓	✓
A-CED-2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	✓	✓	✓	✓
A-CED-3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.	✓	✓	✓	✓
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 $R$ .				

<b>Understand solving equations as a process of reasoning and explain the reasoning</b>					
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.	✓	✓	✓	✓
A-REI-2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.		✓		✓

<b>Solve equations and inequalities in one variable</b>					
A-REI-3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	✓	✓	✓	✓
A-REI-4a	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.		✓		✓
A-REI-4b	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 $a \pm bi$ for real numbers $a$ and $b$ .		✓		✓

**Solve systems of equations**

IPA IA1 IGE IA2

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.				
A-REI-6	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	✓	✓	✓	✓
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 $x^2 + y^2 = 3$ .				✓
A-REI-8	(+) Represent a system of linear equations as a single matrix equation in a vector variable.				✓
A-REI-9	(+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension $3 \times 3$ or greater).				✓

**Represent and solve equations and inequalities graphically**

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).	✓	✓		✓
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.	✓	✓		✓
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.	✓	✓		✓

**High School - Functions (F)**

IPA IA1 IGE IA2

**Understand the concept of a function and use function notation**

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 $y = f(x)$ .		✓		✓
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.		✓		✓
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 $n \geq 1$ .				✓

**Interpret functions that arise in applications in terms of the context**

IPA IA1 IGE IA2

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.		✓		✓
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.				
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.				

**Analyze functions using different representations**

F-IF-7a	Graph linear and quadratic functions and show intercepts, maxima, and minima.	✓	✓	✓	✓
F-IF-7b	Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.		✓		✓
F-IF-7c	Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.				✓
F-IF-7d	(+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.				✓
F-IF-7e	Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.		✓		✓
F-IF-8a	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.		✓		✓
F-IF-8b	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	✓	✓		✓
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.		✓		✓

**Build a function that models a relationship between two quantities**

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

		IPA	IA1	IGE	IA2
F-BF-1c	(+) Compose functions. For example, if $T(y)$ is the temperature in the atmosphere as a function of height, and $h(t)$ is the height of a weather balloon as a function of time, then $T(h(t))$ is the temperature at the location of the weather balloon as a function of time.				✓
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.				✓

#### Build new functions from existing functions

F-BF-3	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$ , $k f(x)$ , $f(kx)$ , 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.		✓		✓
F-BF-4a	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 $x \neq 1$ .				✓
F-BF-4b	(+) Verify by composition that one function is the inverse of another.				✓
F-BF-4c	(+) Read values of an inverse function from a graph or a table, given that the function has an inverse.				
F-BF-4d	(+) Produce an invertible function from a non-invertible function by restricting the domain.				
F-BF-5	(+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.				✓

#### Construct and compare linear, quadratic, and exponential models and solve problems

F-LE-1a	Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.				
F-LE-1b	Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.				
F-LE-1c	Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.				
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).	✓	✓	✓	✓
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.				
F-LE-4	For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where $a$ , $c$ , and $d$ are numbers and the base $b$ is 2, 10, or $e$ ; evaluate the logarithm using technology				

**Interpret expressions for functions in terms of the situation they model**

IPA IA1 IGE IA2

F-LE-5	Interpret the parameters in a linear or exponential function in terms of a context.				
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**Extend the domain of trigonometric functions using the unit circle**

F-TF-1	Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.				✓
F-TF-2	Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.				✓
F-TF-3	(+) Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$ , $\pi/4$ and $\pi/6$ , and use the unit circle to express the values of sine, cosine, and tangent for $\pi-x$ , $\pi+x$ , and $2\pi-x$ in terms of their values for $x$ , where $x$ is any real number.				✓
F-TF-4	(+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.				✓

**Model periodic phenomena with trigonometric functions**

F-TF-5	Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.				
F-TF-6	(+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.				✓
F-TF-7	(+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.				

**Prove and apply trigonometric identities**

F-TF-8	Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$ , $\cos(\theta)$ , or $\tan(\theta)$ given $\sin(\theta)$ , $\cos(\theta)$ , or $\tan(\theta)$ and the quadrant of the angle.				
F-TF-9	(+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.				✓

**High School - Geometry (G)**

IPA IA1 IGE IA2

**Experiment with transformations in the plane**

G-CO-1	Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.			✓	
G-CO-2	Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).	✓		✓	✓

		IPA	IA1	IGE	IA2
G-CO-3	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	✓		✓	✓
G-CO-4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.				
G-CO-5	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.	✓		✓	✓
<b>Understand congruence in terms of rigid motions</b>					
G-CO-6	Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.	✓		✓	✓
G-CO-7	Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.				
G-CO-8	Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.				
<b>Prove geometric theorems</b>					
G-CO-9	Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.			✓	
G-CO-10	Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to $180^\circ$ ; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.			✓	
G-CO-11	Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.			✓	
<b>Make geometric constructions</b>					
G-CO-12	Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.			✓	
G-CO-13	Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.			✓	

<b>Understand similarity in terms of similarity transformations</b>		IPA	IA1	IGE	IA2
G-SRT-1a	A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.				
G-SRT-1b	The dilation of a line segment is longer or shorter in the ratio given by the scale factor.				
G-SRT-2	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.			✓	
G-SRT-3	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar			✓	
<b>Prove theorems involving similarity</b>					
G-SRT-4	Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.			✓	
G-SRT-5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.			✓	
<b>Define trigonometric ratios and solve problems involving right triangles</b>					
G-SRT-6	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.		✓	✓	✓
G-SRT-7	Explain and use the relationship between the sine and cosine of complementary angles.				✓
G-SRT-8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.		✓	✓	✓
<b>Apply trigonometry to general triangles</b>					
G-SRT-9	(+) Derive the formula $A = \frac{1}{2} ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.				
G-SRT-10	(+) Prove the Laws of Sines and Cosines and use them to solve problems.				✓
G-SRT-11	(+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).				✓
<b>Understand and apply theorems about circles</b>					
G-C-1	Prove that all circles are similar.				
G-C-2	Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.			✓	
G-C-3	Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.			✓	

		IPA	IA1	IGE	IA2
G-C-4	(+) Construct a tangent line from a point outside a given circle to the circle.			✓	
<b>Find arc lengths and areas of sectors of circles</b>					
G-C-5	Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.			✓	✓
<b>Translate between the geometric description and the equation for a conic section</b>					
G-GPE-1	Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.				✓
G-GPE-2	Derive the equation of a parabola given a focus and directrix.				✓
G-GPE-3	(+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.				✓
<b>Use coordinates to prove simple geometric theorems algebraically</b>					
G-GPE-4	Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point $(0, 2)$ .			✓	
G-GPE-5	Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).		✓	✓	✓
G-GPE-6	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.				
G-GPE-7	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	✓	✓	✓	
<b>Explain volume formulas and use them to solve problems</b>					
G-GMD-1	Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.				
G-GMD-2	(+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.				
G-GMD-3	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.	✓		✓	
<b>Visualize relationships between two-dimensional and three-dimensional objects</b>					
G-GMD-4	Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.				

**Apply geometric concepts in modeling situations**

IPA IA1 IGE IA2

G-MG-1	Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).				
G-MG-2	Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).				
G-MG-3	Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).				

**Grade 8 Standards - The Number System (8.NS)**

IPA IA1 IGE

**Know that there are numbers that are not rational, and approximate them by rational numbers.**

8.NS-1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.	✓	✓	
8.NS-2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., $\pi^2$ ). For example, by truncating the decimal expansion of $\sqrt{2}$ , show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.			

**Grade 8 Standards - Expressions and Equations (8.EE)**

IPA IA1 IGE

**Work with radicals and integer exponents.**

8.EE-1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$ .	✓	✓	
8.EE-2	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$ , where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.		✓	
8.EE-3	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as $3 \times 10^8$ and the population of the world as $7 \times 10^9$ , and determine that the world population is more than 20 times larger.	✓	✓	

		IPA	IA1	IGE
8.EE-4	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.	✓	✓	

**Understand the connections between proportional relationships, lines, and linear equations.**

8.EE-5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.			
8.EE-6	Use similar triangles to explain why the slope $m$ is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at $b$ .	✓	✓	

**Analyze and solve linear equations and pairs of simultaneous linear equations.**

8.EE-7a	Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$ , $a = a$ , or $a = b$ results (where $a$ and $b$ are different numbers).	✓	✓	✓
8.EE-7b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms	✓	✓	✓
8.EE-8a	Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.	✓	✓	
8.EE-8b	Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.	✓	✓	✓
8.EE-8c	Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.	✓	✓	

**Grade 8 Standards - Functions (8.F)**

IPA IA1 IGE

**Define, evaluate, and compare functions.**

8.F-1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.	✓	✓	
8.F-2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.			
8.F-3	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.	✓	✓	

**Use functions to model relationships between quantities.**

8.F-4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.	✓	✓	
8.F-5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.			

**Grade 8 Standards - Geometry (8.G)**

IPA IA1 IGE

**Understand congruence and similarity using physical models, transparencies, or geometry software.**

8.G-1a	Verify experimentally the properties of rotations, reflections, and translations: Lines are taken to lines, and line segments to line segments of the same length.	✓		✓
8.G-1b	Verify experimentally the properties of rotations, reflections, and translations: Angles are taken to angles of the same measure.	✓		✓
8.G-1c	Verify experimentally the properties of rotations, reflections, and translations: Parallel lines are taken to parallel lines.			
8.G-2	Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.	✓		
8.G-3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	✓		✓

IPA IA1 IGE

8.G-4	Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.			
8.G-5	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.	✓		✓

**Understand and apply the Pythagorean Theorem.**

8.G-6	Explain a proof of the Pythagorean Theorem and its converse.			
8.G-7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.	✓		✓
8.G-8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	✓	✓	✓

**Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.**

8.G-9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	✓		✓
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**Grade 7 Standards - Ratios and Proportional Relationships (7.RP)**

IPA IA1 IGE

**Analyze proportional relationships and use them to solve real-world and mathematical problems.**

7.RP-1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $\frac{1/2}{1/4}$ miles per hour, equivalently 2 miles per hour.			
7.RP-2a	Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.	✓		
7.RP-2b	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.			
7.RP-2c	Represent proportional relationships by equations. For example, if total cost $t$ is proportional to the number $n$ of items purchased at a constant price $p$ , the relationship between the total cost and the number of items can be expressed as $t = pn$ .	✓		

IPA IA1 IGE

7.RP-2d	Explain what a point $(x, y)$ on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where $r$ is the unit rate.			
7.RP-3	Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.	✓		✓

**Grade 7 Standards - The Number System (7.NS)**

IPA IA1 IGE

<b>Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.</b>		✓	✓	
7.NS-1a	Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.			
7.NS-1b	Understand $p + q$ as the number located a distance $ q $ from $p$ , in the positive or negative direction depending on whether $q$ is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.	✓	✓	
7.NS-1c	Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$ . Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.	✓	✓	
7.NS-1d	Apply properties of operations as strategies to add and subtract rational numbers.	✓	✓	
7.NS-2a	Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.	✓	✓	
7.NS-2b	Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If $p$ and $q$ are integers, then $-(p/q) = (-p)/q = p/(-q)$ . Interpret quotients of rational numbers by describing real-world contexts.	✓	✓	
7.NS-2c	Apply properties of operations as strategies to multiply and divide rational numbers.	✓	✓	
7.NS-2d	Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.			
7.NS-3	Solve real-world and mathematical problems involving the four operations with rational numbers.	✓		

**Grade 7 Standards - Expressions and Equations (7.EE)**

IPA IA1 IGE

**Use properties of operations to generate equivalent expressions.**

7.EE-1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	✓	✓	✓
7.EE-2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, $a + 0.05a = 1.05a$ means that “increase by 5%” is the same as “multiply by 1.05.”	✓	✓	✓

**Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**

7.EE-3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.	✓	✓	
7.EE-4a	Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$ , where $p$ , $q$ , and $r$ are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?	✓	✓	
7.EE-4b	Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$ , where $p$ , $q$ , and $r$ are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions.	✓	✓	

**Grade 7 Standards - Geometry (7.G)**

IPA IA1 IGE

**Draw, construct, and describe geometrical figures and describe the relationships between them.**

7.G-1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	✓		
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IPA IA1 IGE

7.G-2	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.			✓
7.G-3	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.			

**Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.**

7.G-4	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	✓		✓
7.G-5	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	✓		✓
7.G-6	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	✓		✓

**Grade 6 Standards - Ratios and Proportional Relationships (6.RP)**

IPA IA1

**Understand ratio concepts and use ratio reasoning to solve problems.**

6.RP-1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”		
6.RP-2	Understand the concept of a unit rate $a/b$ associated with a ratio $a:b$ with $b \neq 0$ , and use rate language in the context of a ratio relationship. For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $3/4$ cup of flour for each cup of sugar.” “We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger.”		
6.RP-3	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.	✓	
6.RP-3a	Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.		
6.RP-3b	Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?	✓	

IPA IA1

6.RP-3c	Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.	✓	✓
6.RP-3d	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.		

**Grade 6 Standards - The Number System (6.NS)**

IPA IA1

**Apply and extend previous understandings of multiplication and division to divide fractions by fractions.**

6.NS-1	Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ of $8/9$ is $2/3$ . (In general, $(a/b) \div (c/d) = ad/bc$ .) How much chocolate will each person get if 3 people share $1/2$ lb of chocolate equally? How many $3/4$ -cup servings are in $2/3$ of a cup of yogurt? How wide is a rectangular strip of land with length $3/4$ mi and area $1/2$ square mi?	✓	✓
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**Compute fluently with multi-digit numbers and find common factors and multiples.**

6.NS-2	Fluently divide multi-digit numbers using the standard algorithm.	✓	✓
6.NS-3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	✓	✓
6.NS-4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express $36 + 8$ as $4(9 + 2)$ .	✓	

**Apply and extend previous understandings of numbers to the system of rational numbers.**

6.NS-5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.		
6.NS-6	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.	✓	✓

		IPA	IA1
6.NS-6a	Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$ , and that 0 is its own opposite.	✓	✓
6.NS-6b	Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.	✓	✓
6.NS-6c	Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.	✓	✓
6.NS-7a	Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret $-3 > -7$ as a statement that $-3$ is located to the right of $-7$ on a number line oriented from left to right.	✓	✓
6.NS-7b	Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write $-3^{\circ}\text{C} > -7^{\circ}\text{C}$ to express the fact that $-3^{\circ}\text{C}$ is warmer than $-7^{\circ}\text{C}$ .		
6.NS-7c	Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. For example, for an account balance of $-30$ dollars, write $ -30  = 30$ to describe the size of the debt in dollars.	✓	✓
6.NS-7d	Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than $-30$ dollars represents a debt greater than 30 dollars.		
6.NS-8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	✓	

### Grade 6 Standards - Expressions and Equations (6.EE)

IPA IA1

#### Apply and extend previous understandings of arithmetic to algebraic expressions.

6.EE-1	Write and evaluate numerical expressions involving whole-number exponents.	✓	✓
6.EE-2a	Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract $y$ from 5" as $5 - y$ .	✓	✓
6.EE-2b	Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression $2(8 + 7)$ as a product of two factors; view $(8 + 7)$ as both a single entity and a sum of two terms.	✓	✓

		IPA	IA1
6.EE-2c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$ .	✓	✓
6.EE-3	Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$ ; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$ ; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$ .	✓	✓
6.EE-4	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number $y$ stands for.	✓	✓
<b>Reason about and solve one-variable equations and inequalities.</b>			
6.EE-5	Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.	✓	✓
6.EE-6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.	✓	✓
6.EE-7	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which $p, q$ and $x$ are all nonnegative rational numbers.	✓	✓
6.EE-8	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.		
<b>Represent and analyze quantitative relationships between dependent and independent variables.</b>			
6.EE-9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.	✓	✓

**Solve real-world and mathematical problems involving area, surface area, and volume.**

6.G-1	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.	✓	
6.G-2	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.	✓	
6.G-3	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.	✓	
6.G-4	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.		

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