Range Performance Level Descriptors

Grade 8 Math

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8.1.2.A Extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers.	• Places numbers in a visual representation of the subsets whole numbers, integers, and rational numbers.	• Identifies and justifies visual representations that display relationships among the subsets of real numbers. • Classifies rational numbers and describes the relationship among the subsets of real numbers.	• Classifies real numbers and justifies using attributes of the subsets of real numbers. • Generalizes relationships among the subsets of real numbers.	• Describes an error in a visual representation and justifies using attributes of the subsets of real numbers.
8.1.2.B Approximate the value of an irrational number, including π and square roots of numbers less than 225, and locate that rational number approximation on a number line.	• Approximates the value of an irrational square root in a numeric expression. • Plots the approximate location of an irrational square root on a number line. • Identifies the two consecutive integers between which an irrational number lies.	• Approximates the value of an irrational number given a point on a number line. • Identifies the two rational numbers between which an irrational number lies.	• Plots the approximate location of an irrational number in terms of π on a number line.	• Applies an approximated value of an irrational number to real-world contexts.

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8.1.2.C Convert between standard decimal notation and scientific notation.	• Identifies a number written in scientific notation given a number written in standard notation that contains a decimal point, from real-world contexts. • Identifies a number written in standard notation given a number written in scientific notation that contains a positive power of 10.	• Identifies a number written in scientific notation given a whole number written in standard notation from real-world contexts. • Identifies a number written in standard notation given a number written in scientific notation that contains a negative power of 10. • Determines whether a number written as a product of a rational number and a power of 10 is in scientific notation.	• Creates or writes a number in standard notation given scientific notation.	• Creates or writes a number in scientific notation given standard notation.
8.1.2.D Order a set of real numbers arising from mathematical and real-world contexts.	• Compares two positive rational numbers using inequality symbols. • Identifies a list of positive real numbers in ascending or descending order.	• Identifies a value that satisfies a compound inequality involving comparisons of positive real numbers.	• Identifies or creates an inequality given two real numbers. • Orders a set of real numbers in ascending or descending order.	• Applies ordering a set of real numbers to real-world or mathematical contexts from a variety of numerical representations, such as absolute values, exponents, and irrational numbers written in terms of π.

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8.2.4.A Use similar right triangles to develop an understanding that slope, m, given as the rate comparing the change in y-values to the change in x-values, $(y_2 - y_1)/(x_2 - x_1)$, is the same for any two points (x_1, y_1) and (x_2, y_2) on the same line.	• Identifies coordinates for a point on a line that completes a right triangle that lies on the same line as a given similar triangle, where vertices are shown on a coordinate plane.	• Identifies or completes a statement comparing the slopes of segments formed by points on the same line using similar right triangles shown on a coordinate plane.	• Identifies or completes a statement comparing the slopes of segments formed by points on the same line using similar right triangles shown on a coordinate plane and justifies the comparison. • Identifies a proportion comparing the numeric change in y-values to the change in x-values to show that the slopes of segments formed by points on the same line are equal, given similar triangles shown on a coordinate plane.	• Identifies coordinates for a point on a line that completes a right triangle that lies on the same line as a given similar triangle. • Creates a proportion comparing side lengths of segments to show that the slopes of segments formed by points on the same line are equal, given similar triangles shown on a coordinate plane.
8.2.4.B Graph proportional relationships, interpreting the unit rate as the slope of the line that models the relationship.	• Identifies a graph of a proportional relationship with a whole number unit rate for which the given rate values can be identified on the graph.	• Identifies a graph of a proportional relationship with a rational unit rate for which the given rate values can be identified on the graph.	• Creates a graph of a proportional relationship with a unit rate for which an equivalent rate must be calculated using the given rate values.	• Creates a graph of a proportional relationship with a unit rate for which an equivalent rate must be calculated using the given fractional rate values.
8.2.4.C Use data from a table or graph to determine the rate of change or slope and y-intercept in mathematical and real-world problems.	• Calculates an integral rate of change given a table where the change in the independent variable is constant. • Calculates a slope given a graph with an integral rate of change.	• Calculates a y-intercept given a table where the change in the independent variable is constant.	• Determines slope and y-intercept given a graph of a linear function.	• Determines rate of change and y-intercept given a table where the change in the independent variable is not constant.

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8.2.5.A Represent linear proportional situations with tables, graphs, and equations in the form of $y = kx$.	• Identifies a table or graph representing a proportional relationship given a verbal description including the unit rate of change.	• Identifies a table or graph representing a proportional relationship given a verbal description that does not include the unit rate of change. • Identifies an equation representing a proportional relationship given a verbal description including the unit rate of change. • Identifies a graph representing a proportional relationship given an equation in the form $y = kx$.	• Identifies an equation representing a proportional relationship given a verbal description or a graph that does not include the unit rate of change. • Completes a table representing a proportional relationship given corresponding x-values and y-values. • Creates a graph representing a proportional relationship given a verbal description.	• Creates a graph representing a proportional relationship given corresponding x-values and y-values.

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8.2.5.B Represent linear non-proportional situations with tables, graphs, and equations in the form of $y = mx + b$, where $b \neq 0$.	• Identifies the equation that represents a linear non-proportional relationship given a verbal description that includes the rate of change and initial value.	• Identifies the equation that represents a linear non-proportional relationship given a table of values where the change in the independent variable is constant. • Identifies a table or graph that represents a linear non-proportional situation given a verbal description that includes an integral rate of change and initial value.	• Completes the equation that represents a linear non-proportional relationship given a table of values where the change in the independent variable is not constant. • Identifies a table or graph that represents a linear non-proportional relationship given a verbal description that includes fractional rates of change and initial values. • Completes a table that represents a linear non-proportional relationship.	• Identifies the equation or table that represents a linear non-proportional situation given a verbal description that requires calculation to determine the rate of change or initial value.
8.2.5.E Solve problems involving direct variation.	• Solves problems involving direct variation from real-world contexts in which the given related values are factors of the missing quantity.	• Solves problems involving direct variation from real-world contexts requiring calculation of the constant of variation.	• Solves for the dependent variable given mathematical relationships involving direct variation. • Completes a table to model direct variation relationships.	• Solves for the independent variable given mathematical relationships involving direct variation.

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8.2.5.F Distinguish between proportional and non-proportional situations using tables, graphs, and equations in the form $y = kx$ or $y = mx + b$, where $b \neq 0$.	• Identifies a graph of a linear function as having a proportional or non-proportional relationship.	• Identifies a table that represents a linear function as having a proportional or non-proportional relationship. • Identifies an equation that represents a linear function, where the slope is an integer, as a proportional or non-proportional relationship.	• Identifies a table that represents a linear function as a proportional or non-proportional relationship and justifies the decision using attributes of proportional and non-proportional relationships. • Identifies an equation that represents a linear function, where the slope is a rational number, and the relationship is proportional or non-proportional.	• Identifies an equation that represents a linear function as having a proportional or non-proportional relationship and justifies the decision using attributes of proportional and non-proportional relationships.
8.2.5.G Identify functions using sets of ordered pairs, tables, mappings, and graphs.	• Identifies a function from a set of tables or a set of graphs.	• Identifies a relation as a function from sets of ordered pairs or a set of mappings. • Determines which point to remove from a set of ordered pairs or a table to make the relation a function.	• Identifies a relation as a function from a combination of representations. • Determines which point could be added to a relation so that the relation remains a function.	• Identifies a relation as a function and justifies the decision using attributes of functions.

TE★AS ASSESSMENT

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8.2.5.H Identify examples of proportional and non-proportional functions that arise from mathematical and real-world problems.	• Identifies a proportional or non-proportional relationship given a set of graphs.	• Identifies a proportional or non-proportional relationship given a set of tables containing integer values. • Identifies a proportional or non-proportional relationship given a set of real-world situations.	• Identifies a proportional or non-proportional relationship given a set of equations in slope-intercept form. • Describes each linear relationship in a real-world situation as being proportional or non-proportional.	• Identifies a proportional or non-proportional relationship given a set of tables containing rational values. • Identifies a proportional or non-proportional relationship given a set of equations.
8.2.5.I Write an equation in the form $y = mx + b$ to model a linear relationship between two quantities using verbal, numerical, tabular, and graphical representations.	• Identifies an equation in the form $y = mx + b$ that models a real-world situation, given the rate of change and initial value.	• Identifies an equation in the form $y = mx + b$ that models a real-world situation, given a graph. • Identifies an equation in the form $y = mx + b$ that models a linear relationship, given a graph or table.	• Identifies an equation in the form $y = mx + b$ that models a real-world situation, given a set of independent and dependent values. • Creates an equation in the form $y = mx + b$ that models a linear relationship.	• Writes an equation in the form $y = mx + b$ that models a linear relationship, given a real-world or mathematical context.
8.2.8.A Write one-variable equations or inequalities with variables on both sides that represent problems using rational number coefficients and constants.	• Identifies or completes a one-variable equation with integer coefficients and constants that represents a real-world situation.	• Identifies or completes a one-variable equation with rational number coefficients and constants that represents a real-world situation. • Identifies or completes a one-variable inequality with integer coefficients and constants that represents a real-world situation.	• Identifies or completes a one-variable inequality with rational number coefficients and constants that represents a real-world situation.	• Creates a one-variable equation or inequality with variables on both sides that represents a real-world situation.

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8.2.8.B Write a corresponding real-world problem when given a one-variable equation or inequality with variables on both sides of the equal sign using rational number coefficients and constants.	• Identifies a real-world situation represented by a given one-variable equation with integer coefficients and constants.	• Identifies a real-world situation represented by a given one-variable equation with rational number coefficients and constants. • Completes a real-world situation that can be represented by a given one-variable equation with integer coefficients and constants. • Identifies a real-world situation represented by a given one-variable inequality with integer coefficients and constants.	• Completes a real-world situation that can be represented by a given one-variable inequality with integer coefficients and constants. • Identifies a real-world situation that can be represented by a given one-variable inequality with rational number coefficients and constants.	• Completes a real-world situation that can be represented by a given one-variable equation or inequality with variables on both sides of the equal sign using rational number coefficients and constants.
8.2.8.C Model and solve one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants.	• Identifies an integer solution given an equation or a pictorial model with variables on both sides of the equal sign and positive coefficients.	• Identifies a rational solution given an equation or a pictorial model with variables on both sides of the equal sign. • Solves an equation that requires combining like terms on one side of the equal sign. • Identifies an integer solution for real-world problems that could be represented by an equation with variables on both sides of the equal sign.	• Solves an equation with an integer solution given an equation or a pictorial model with variables on both sides of the equal sign. • Identifies a rational solution for a real-world problem that could be represented by an equation with variables on both sides of the equal sign.	• Solves an equation with an integer solution given an equation or a pictorial model with variables on both sides of the equal sign, which could involve the application of the distributive property on one side of the equal sign. • Models and solves a real-world problem that can be represented by an equation with variables on both sides of the equal sign.

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8.2.9.A Identify and verify the values of x and y that simultaneously satisfy two linear equations in the form $y = mx + b$ from the intersections of the graphed equations.	• Identifies the ordered pair that simultaneously satisfies two linear equations given a graph where the intersection point is in Quadrant I.	• Identifies the ordered pair that simultaneously satisfies two linear equations given a graph. • Identifies a statement that describes the ordered pair that simultaneously satisfies two linear equations representing a real-world situation given a graph.	• Identifies statements that describe each coordinate of the ordered pair that simultaneously satisfies two linear equations representing a real-world situation given a graph.	• Writes the coordinates of the ordered pair that simultaneously satisfies two linear equations given a graph. • Writes or completes the statement that describes each coordinate of the ordered pair that simultaneously satisfies two linear equations representing a real-world situation given a graph.
8.3.3.A Generalize that the ratio of corresponding sides of similar shapes are proportional, including a shape and its dilation.	• Determines the proportional relationship of corresponding sides of similar figures, where the orientation of the figures is the same and the sides are labeled with variables and whole numbers.	• Determines the proportional relationship of corresponding sides of similar figures, where the orientation of the figures is the same and the sides are labeled with variables and rational numbers. • Determines the proportional relationship of corresponding sides of similar figures, where the figures are reflected and the sides are labeled with variables and numbers.	• Determines the proportional relationship of corresponding sides of similar figures, where the orientation of the figures is the same and the sides are not labeled with variables or numbers. • Determines the proportional relationship of corresponding sides of similar figures, where the figures are rotated and the sides are labeled with variables and numbers. • Determines the proportional relationship of corresponding sides of similar figures, where the figures have a common vertex.	• Determines the proportional relationship of corresponding sides of similar figures, where the figures are reflected or rotated and the sides are not labeled with variables or numbers. • Determines the proportional relationship of corresponding sides of similar figures, where the figures have a common side.

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8.3.3.B Compare and contrast the attributes of a shape and its dilation(s) on a coordinate plane.	• Identifies a statement about the effects of a dilation given the scale factor and the graph of the pre-image.	• Identifies a statement about the effects of a dilation given the graph of the pre-image and an algebraic rule for the dilation. • Identifies a statement about the relationship of the side lengths of a dilated image given the scale factor and the graph of the pre-image.	• Identifies a statement about the relationship of the side lengths and scale factor of a dilated image given the graph of the image and pre-image. • Identifies a statement about the relationship of the angles of a dilated image given the scale factor and the graph of the pre-image.	• Identifies a statement about the relationship of the side lengths of a dilated image given the graph of the pre-image and an algebraic rule for the dilation. • Identifies a statement about the relationship of the angles of a dilated image given the graph of the pre-image and an algebraic rule for the dilation.

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8.3.3.C Use an algebraic representation to explain the effect of a given positive rational scale factor applied to two-dimensional figures on a coordinate plane with the origin as the center of dilation.	• Determines the algebraic representation of a dilation when given a whole number scale factor greater than 1.	• Determines the algebraic representation of a dilation when given a graph or a set of ordered pairs containing the vertices of the image and pre-image, where the scale factor is a whole number or decimal greater than 1.	• Identifies the algebraic representation of a dilation when given a description of the image as being larger or smaller than the pre-image. • Determines the algebraic representation of a dilation when given a table containing the vertices of the image and pre-image, where the scale factor is a rational number. • Determines the algebraic representation of a dilation when given a graph of the image and pre-image, where the scale factor is a rational number. • Determines the algebraic representation of a dilation when given corresponding ordered pairs from the graph of the image and pre-image. • Identifies the ordered pair on the graph of a dilation when given the scale factor as a variable.	• Determines the algebraic representation of a dilation when given the graph of the pre-image and the ordered pair of a corresponding point on the graph of the image.

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8.3.6.A Describe the volume formula $V = Bh$ of a cylinder in terms of its base area and its height.	• Identifies the equation that could be used to determine the area of the base of a cylinder given the volume and height of the cylinder.	• Identifies the equation that represents the area of the base of a cylinder given the volume and height of the cylinder. • Identifies the equation that could be used to determine the height of a cylinder given the volume of the cylinder and the diameter or radius of the base of the cylinder. • Identifies the equation or expression that represents the volume of a cylinder given the height of the cylinder and the diameter or radius of the base of the cylinder.	• Creates an equation that represents the area of the base of a cylinder given the volume and height of the cylinder. • Identifies the equation that represents the height of a cylinder given the volume and area of the base of the cylinder. • Creates an equation or expression that represents the volume of a cylinder given the height of the cylinder and the diameter or radius of the base of the cylinder.	• Creates an equation that represents the height of a cylinder given the volume of the cylinder and the diameter or radius of the base of the cylinder.
8.3.6.C Use models and diagrams to explain the Pythagorean theorem.	• Identifies the statement that relates the combined areas of the squares that lie on the legs of a right triangle to the area of the square that lies on the hypotenuse.	• Identifies the statement that explains the relationship between the squares that lie on the legs of a right triangle and the square that lies on the hypotenuse. • Identifies a set of squares that could be used to create a right triangle, where the side length of each square is given.	• Determines a set of squares that could be used to create a right triangle, where the side length or area of each square is given. • Determines the length of a side in a right triangle when given the lengths of the other sides or the areas of squares that lie on those sides.	• Determines the area of a square that lies on a side of a right triangle when given the lengths of the other sides or the areas of squares that lie on those sides.

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8.3.7.A Solve problems involving the volume of cylinders, cones, and spheres.	• Approximates the volume of a sphere given the radius of the sphere.	• Approximates the volume of a sphere given the diameter of the sphere. • Approximates the volume of a cylinder given the height of the cylinder and the diameter or radius of the base of the cylinder. • Approximates the volume of a cone given the height of the cone and the diameter or radius of the base of the cone.	• Determines the volume of a sphere, in terms of π, given the radius or diameter of the sphere. • Determines the volume of a cylinder, in terms of π, given the height of the cylinder and the diameter or radius of the base of the cylinder. • Determines the volume of a cone, in terms of π, given the height of the cone and the diameter or radius of the base of the cone. • Approximates the radius of the base of a cylinder given the height and approximate volume of the cylinder. • Approximates the height of a cylinder given the diameter or radius of the base and the approximate volume of the cylinder. • Approximates the radius of the base of a cone given the height and approximate volume of the cone. • Approximates the height of a cone given the diameter or radius of the base and the approximate volume of the cone.	• Determines the radius of the base of a cylinder given the height and volume of the cylinder. • Determines the height of a cylinder given the volume of the cylinder, in terms of π, and the diameter or radius of the base of the cylinder. • Determines the radius of the base of a cone given the height and volume of the cone, in terms of π. • Determines the height of a cone given the volume of the cone, in terms of π, and the diameter or radius of the base of the cone. • Determines the volume of composite three-dimensional shapes given the radius or diameter and the height.

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8.3.7.B Use previous knowledge of surface area to make connections to the formulas for lateral and total surface area and determine solutions for problems involving rectangular prisms, triangular prisms, and cylinders.	• Determines the height of a triangular prism given the perimeter of the base and the lateral surface area of the prism. • Determines the height of a rectangular prism given the perimeter of the base and the total surface area of the prism.	• Approximates the total surface area of a cylinder given the height of the cylinder and the diameter or radius of the base of the cylinder. • Approximates the lateral surface area of a cylinder given the height of the cylinder and the diameter or radius of the base of the cylinder. • Determines the total surface area of a rectangular prism given the dimensions of the prism.	• Determines the lateral surface area of a triangular prism given the dimensions of the base and the height of the prism. • Determines the height of a triangular prism given the dimensions of the base and the lateral surface area of the prism. • Determines the total surface area of a cylinder, in terms of π, given the height of the cylinder and the diameter or radius of the base of the cylinder. • Determines the lateral surface area of a cylinder, in terms of π, given the height of the cylinder and the diameter or radius of the base of the cylinder. • Determines the height of a cylinder given the lateral surface area of the cylinder and the diameter or radius of the base of the cylinder. • Determines the radius of a cylinder given the lateral surface area and the height of the cylinder.	• Determines the total surface area of a triangular prism given the dimensions of the base and the height of the prism. • Determines the height of a rectangular prism given the total surface area and the dimensions of the base of the prism.

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8.3.7.C Use the Pythagorean theorem and its converse to solve problems.	• Identifies the length of the hypotenuse or a leg of a right triangle when given a diagram labeled with the lengths of the other two sides.	• Identifies the length of the hypotenuse or a leg of a right triangle when given the lengths of the other two sides. • Identifies the length of a diagonal of a rectangle when given a diagram labeled with the length and width of the rectangle. • Identifies whether a set of measurements could or could not be the side lengths of a right triangle. • Labels a missing side length of right triangle when given a diagram with some of its dimensions.	• Identifies an equation that proves that a quadrilateral is a rectangle when given the measures of the length, width, and diagonal of the quadrilateral. • Classifies a triangle as either a right triangle or not a right triangle when given the side lengths. • Identifies the perimeter of a right triangle when given a diagram labeled with the lengths of two sides.	• Calculates the length of the hypotenuse or a leg of a right triangle when given the lengths of the other two sides. • Identifies the length, width, or the length of a diagonal of a rectangle when given the other two dimensions. • Determines the side length of a quadrilateral when given a diagram with some of it dimensions and justifies the calculation using the Pythagorean theorem.
8.3.7.D Determine the distance between two points on a coordinate plane using the Pythagorean theorem.	• Identifies the distance between two points when given a graph of the two points, where the two points are in the same quadrant.	• Identifies the distance between two points when given a graph of the two points.	• Identifies the distance between two points when given a graph of one point and a description of the location of the second point in relation to the first point. • Identifies the length of a segment when given the graph of a non-horizontal, non-vertical segment.	• Calculates the distance between two points when given two ordered pairs.

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8.3.8.D Use informal arguments to establish facts about the angle sum and exterior angle of triangles, the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.	• Identifies a statement that describes a missing angle measure when given a partially labeled diagram and three labeled diagrams of an angle relationship.	• Determines an expression or equation that models an angle relationship when given a partially labeled diagram and three labeled diagrams of an angle relationship.	• Completes a statement that describes an angle relationship when given a partially labeled diagram and three labeled diagrams of an angle relationship.	• Determines missing angle measures when given a partially labeled diagram and three labeled diagrams of an angle relationship.
8.3.10.A Generalize the properties of orientation and congruence of rotations, reflections, translations, and dilations of two-dimensional shapes on a coordinate plane.	• Identifies the statement that describes the effect of a rotation, reflection, or translation in terms of side lengths, angle measures, and figure orientation when given the graph of the image and pre-image.	• Identifies the statement that describes the effect of a rotation, reflection, or translation in terms of side lengths, angle measures, or figure orientation when given the graph or a description of the pre-image.	• Identifies the statement that describes the effect of a transformation in terms of side lengths, angle measures, or figure orientation when given an algebraic representation or a graph of the pre-image.	• Identifies a transformation when given effects of the transformation on a figure.
8.3.10.B Differentiate between transformations that preserve congruence and those that do not.	• Identifies the transformation that does not preserve congruence, where the scale factor of the dilation is an integer.	• Identifies the transformation that does not preserve congruence, where the scale factor of the dilation is a rational number. • Identifies the transformation that preserves congruence.	• Identifies the algebraic representation of a transformation that does or does not preserve congruence.	• Identifies the verbal description of a transformation that does or does not preserve congruence. • Identifies the vertices of an image transformed in a way that does not preserve congruence, when given the vertices or graph of the pre-image.

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8.3.10.C Explain the effect of translations, reflections over the *x*- or *y*-axis, and rotations limited to 90°, 180°, 270°, and 360° as applied to two-dimensional shapes on a coordinate plane using an algebraic representation.	• Determines the algebraic representation of a translation when given a verbal description of the translation, where both the *x*-coordinate and the *y*-coordinate are translated.	• Determines the algebraic representation of a translation when given a verbal description of the translation, where only the *x*-coordinate or the *y*-coordinate is translated. • Determines the algebraic representation of a reflection when given a verbal description of the reflection. • Determines the algebraic representation of a rotation of 180° about the origin when given a verbal description of the rotation.	• Determines the algebraic representation of a translation when given the graph of the image and pre-image. • Determines the algebraic representation of a reflection when given the graph of the image and pre-image. • Determines the algebraic representation of a clockwise rotation about the origin when given a verbal description of the rotation. • Identifies a transformation as a translation or reflection when given the algebraic representation of the transformation.	• Determines the algebraic representation of a clockwise rotation about the origin when given the graph of the image and pre-image. • Determines the algebraic representation of a counterclockwise rotation about the origin when given a verbal description of the rotation. • Determines the algebraic representation of a counterclockwise rotation about the origin when given the graph of the image and pre-image. • Identifies a transformation as a rotation when given the algebraic representation of the transformation.

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8.3.10.D Model the effect on linear and area measurements of dilated two-dimensional shapes.	• Identifies the statement that relates the perimeter of an image to the perimeter of the pre-image when given an integer scale factor.	• Identifies the statement that relates the perimeter of an image to the perimeter of the pre-image when given a rational number scale factor.	• Identifies the statement that relates the area of an image to the area of the pre-image when given an integer scale factor. • Identifies an expression that represents the perimeter of an image when given the dimensions or perimeter of the pre-image. • Determines the ratio of the perimeters of the image and pre-image.	• Identifies the statement that relates the area of an image to the area of the pre-image when given a rational number scale factor. • Identifies an expression that represents the area of an image when given the dimensions or area of the pre-image. • Determines the ratio of the areas of the image and pre-image.
8.4.5.C Contrast bivariate sets of data that suggest a linear relationship with bivariate sets of data that do not suggest a linear relationship from a graphical representation.	• Identifies the graph that shows a linear relationship when given bivariate sets of data graphed on a coordinate grid.	• Identifies the graph that shows a non-linear relationship when given bivariate sets of data graphed on a coordinate grid. • Determines a set of points that could be added to the graph of a bivariate set of data so that the relationship remains linear.	• Describes the relationship of a bivariate set of data graphed on a coordinate grid as linear.	• Describes the relationship of a bivariate set of data graphed on a coordinate grid as non-linear.

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8.4.5.D Use a trend line that approximates the linear relationship between bivariate sets of data to make predictions.	• Determines the value of the response variable when given the value of an explanatory variable of a bivariate set of data with a strong positive linear relationship.	• Determines the value of the response variable when given the value of an explanatory variable of a bivariate set of data with a positive linear relationship.	• Determines the value of the response variable when given the value of an explanatory variable of a bivariate set of data with a negative linear relationship. • Determines the value of the explanatory variable when given the value of a response variable of a bivariate set of data with a positive linear relationship.	• Determines the value of the explanatory variable when given the value of a response variable of a bivariate set of data with a negative linear relationship.
8.4.11.A Construct a scatterplot and describe the observed data to address questions of association such as linear, non-linear, and no association between bivariate data.	• Identifies or completes the statement that describes the relationship of a bivariate set of data graphed on a coordinate grid where the graph shows a positive linear association.	• Identifies or completes the statement that describes the relationship of a bivariate set of data graphed on a coordinate grid, where the graph shows a negative linear association. • Identifies the graph that shows a negative or positive linear association when given a bivariate set of data graphed on a coordinate grid.	• Identifies or completes the statement that describes the relationship of a bivariate set of data graphed on a coordinate grid, where the graph shows no apparent association.	• Identifies or completes the statement that describes the relationship of a bivariate set of data graphed on a coordinate grid, where the graph shows a non-linear association. • Constructs a scatterplot that shows the relationship of a bivariate set of data such as linear, non-linear, and no association.

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8.4.11.B Determine the mean absolute deviation and use this quantity as a measure of the average distance data are from the mean using a data set of no more than 10 data points.	• Calculates the mean absolute deviation from a data set that contains no more than 5 data values, where the mean and the mean absolute deviation are whole numbers.	• Calculates the mean absolute deviation from a data set that contains no more than 5 data values, where the mean and the mean absolute deviation are rational numbers.	• Calculates the mean absolute deviation from a data set that contains no more than 10 data values, where the mean is a whole number and the mean absolute deviation is a rational number.	• Calculates the mean absolute deviation from a data set that contains no more than 10 data values, where the mean and the mean absolute deviation are rational numbers.
8.4.12.A Solve real-world problems comparing how interest rate and loan length affect the cost of credit.	• Identifies the difference between the total amounts of interest paid for two different loans when given the loan length and interest rate for each loan, where the interest rate is a whole number percent.	• Identifies the difference between the total amounts of interest paid for two different loans when given the loan length and interest rate for each loan, where the interest rate is a decimal percent. • Completes statements identifying the cost of credit for two different loans when given the loan lengths and interest rates. • Identifies a loan with the greatest cost of credit when given a set of loan lengths and interest rates.	• Completes statements comparing the cost of credit for two different loans when given the loan lengths and interest rates.	• Calculates the difference between the total amounts of interest paid for two different loans when given the loan length and interest rate for each loan.

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| 8.4.12.C Explain how small amounts of money invested regularly, including money saved for college and retirement, grow over time. | • Identifies how the balance in an account grows, given general information about the type of activity in the account. | • Determines the effect of regular deposits and interest on the balance of account when given a table showing the activity in the account over a length of time. | • Determines the effect of regular deposits and interest on the balance of an account when given quantitative information about the activity in the account. | • Describes how the interest rate is applied to an account, given a table showing the activity in the account over a length of time. |
| 8.4.12.D Calculate and compare simple interest and compound interest earnings. | • Calculates the simple interest earnings on an investment given a principal amount, a length of time, and an interest rate. | • Calculates the total amount of an investment that earns compound interest, given a principal amount, a length of time, and an interest rate. | • Calculates compound interest earnings on an investment given a principal amount, a length of time, and an interest rate.
• Calculates the total amount of an investment for a simple interest investment given a principal amount, a length of time, and an interest rate. | • Calculates the difference between investment values given a principal amount, investment types, lengths of time, and interest rates.
• Completes a statement identifying or comparing the interest earnings or investment values for two different investments given a principal amount, investment types, lengths of time, and interest rates. |
| 8.4.12.G Estimate the cost of a two-year and four-year college education, including family contribution, and devise a periodic savings plan for accumulating the money needed to contribute to the total cost of attendance for at least the first year of college. | • Determines the amount of money to save on a regular basis to pay for one year of college, given the cost of tuition per year at the college. | • Determines the amount of money to save on a regular basis to pay for one year of college, where tuition will be partly paid with a scholarship or previous savings, given the cost of tuition per year at the college. | • Determines the amount of money to save on a regular basis for one or two years of college, where tuition will be partly paid with a scholarship or previous savings, and the total cost of attending the college must be calculated. | • Determines the amount of money to save on a regular basis for two or more years of college, where tuition will be partly paid with a scholarship or previous savings, and the total cost of attending the college must be calculated. |