extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers.[8.2A]

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.[8.2B]

convert between standard decimal notation and scientific notation.[8.2C]

order a set of real numbers arising from mathematical and real-world contexts.[8.2D]

generalize that the ratio of corresponding sides of similar shapes are proportional, including a shape and its dilation.[8.3A]

compare and contrast the attributes of a shape and its dilation(s) on a coordinate plane.[8.3B]

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.[8.3C]

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.[8.4A]

graph proportional relationships, interpreting the unit rate as the slope of the line that models the relationship.[8.4B]

use data from a table or graph to determine the rate of change or slope and y-intercept in mathematical and real-world problems.[8.4C]

represent linear proportional situations with tables, graphs, and equations in the form of y = kx.[8.5A]

represent linear non-proportional situations with tables, graphs, and equations in the form of $y = mx + b$, where $b \neq 0$.[8.5B]

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.[8.5C]

use a trend line that approximates the linear relationship between bivariate sets of data to make predictions.[8.5D]

solve problems involving direct variation.[8.5E]

distinguish between proportional and non-proportional situations using tables, graphs, and equations in the form $y = kx$ or $y = mx + b$, where $b \neq 0$.[8.5F]

identify functions using sets of ordered pairs, tables, mappings, and graphs.[8.5G]

identify examples of proportional and non-proportional functions that arise from mathematical and real-world problems.[8.5H]

write an equation in the form y = mx + b to model a linear relationship between two quantities using verbal, numerical, tabular, and graphical representations.[8.5I]

describe the volume formula V = Bh of a cylinder in terms of its base area and its height.[8.6A]

model the relationship between the volume of a cylinder and a cone having both congruent bases and heights and connect that relationship to the formulas.[8.6B]

use models and diagrams to explain the Pythagorean theorem.[8.6C]

solve problems involving the volume of cylinders, cones, and spheres.[8.7A]

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.[8.7B]

use the Pythagorean Theorem and its converse to solve problems.[8.7C]

determine the distance between two points on a coordinate plane using the Pythagorean Theorem.[8.7D]

write one-variable equations or inequalities with variables on both sides that represent problems using rational number coefficients and constants.[8.8A]

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.[8.8B]

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.[8.8C]

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.[8.8D]

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.[8.9A]

generalize the properties of orientation and congruence of rotations, reflections, translations, and dilations of two-dimensional shapes on a coordinate plane.[8.10A]

differentiate between transformations that preserve congruence and those that do not.[8.10B]

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.[8.10C]

model the effect on linear and area measurements of dilated two-dimensional shapes.[8.10D]

construct a scatterplot and describe the observed data to address questions of association such as linear, non-linear, and no association between bivariate data.[8.11A]

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.[8.11B]

simulate generating random samples of the same size from a population with known characteristics to develop the notion of a random sample being representative of the population from which it was selected.[8.11C]

solve real-world problems comparing how interest rate and loan length affect the cost of credit.[8.12A]

calculate the total cost of repaying a loan, including credit cards and easy access loans, under various rates of interest and over different periods using an online calculator.[8.12B]

explain how small amounts of money invested regularly, including money saved for college and retirement, grow over time.[8.12C]

calculate and compare simple interest and compound interest earnings.[8.12D]

identify and explain the advantages and disadvantages of different payment methods.[8.12E]

analyze situations to determine if they represent financially responsible decisions and identify the benefits of financial responsibility and the costs of financial irresponsibility.[8.12F]

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.[8.12G]