

Accelerated Math 7/8 - What Your Child Will Learn

Unit 1: Rational Numbers & Exponents

Equivalent forms: fractions, decimals, and percents

This topic reviews the three forms of rational numbers that are used most frequently in situations: fractions, decimals, and percents. Students use these rational numbers in real-world settings and explore order-from least to greatest or vice versa. Students practice converting from one form of rational number to another through multiple representations.

Applications of percents

This topic investigates the various uses of percent in solving real-world problems. Applications include gratuities, commissions, fees, percent error, discount, markup, increases and decreases in value, and simple interest.

Rational numbers

This topic builds on students' prior work with applying properties of operations to solve problems with positive fractions and decimals, and with integers. Students will solve real-world and mathematical problems involving the four operations with positive and negative rational numbers including negative fractions and decimals.

Real numbers

This topic explores the set of real numbers by investigating the idea that some numbers are not rational. The number line and the coordinate grid are used as models. Areas of squares that are drawn on grid or dot paper form the first set of key images in this topic. Students discover the relationship between a square's side length and area to estimate irrational numbers. Analogously, students study the relationship between a cube's volume and edge length to learn about cube roots.

Laws of exponents and scientific notation

This topic introduces laws of exponents, including principles for multiplying and dividing exponential expressions with common bases. It also uses explorations of number patterns to develop the meanings of positive and negative exponents and zero as an exponent. Students then expand their understanding of exponents to represent numbers in scientific notation and to perform operations with numbers expressed in scientific notation.

Unit 2: Proportionality and Linear Relationships

Using ratios

This topic explores and applies proportional reasoning through multiple representations. Students interactively use ratios and proportional reasoning to enlarge and reduce images. They also apply ratios and proportional reasoning in a variety of contexts. Real-world applications engage students to explore and make reasonable conjectures while testing their predictions.

Ratios and rates

In this topic, students will apply their understanding of ratios and proportional reasoning to working with rates and unit rates in a variety of contexts such as speed, mileage, and unit pricing, including situations involving ratios of fractions. Students will also find and apply a constant proportionality to solve problems involving indirect measurement of distant objects.

Patterns in Proportional Relationships

Students will build on their understanding of proportional relationships, rates, and unit rates in additional algebraic contexts and represent those relationships in multiple ways. Students will interpret the meaning of specific points on the graph of a proportional relationship in terms of the scenario represented. Students will write and solve simple equations to ask and answer questions involving proportional relationships.

Equations and inequalities

In this topic, students will build on their understanding of proportional relationships to including other linear relationships and linear inequalities. Students will also broaden their understanding of algebraic expressions by applying properties of operations to solve problems with linear equations and inequalities. Throughout this topic, students will interpret their symbolic representations in relation to the contexts they are investigating.

Exploring rate of change in motion problems

Understanding the rate at which one quantity changes with respect to another is key to understanding how the two quantities are related. In this topic, students explore the concept of rate by analyzing motion over time. Students investigate the rate at which distance changes numerically and graphically.

Linear patterns and functions

In this topic, students explore patterns through problems, using multiple representations, such as tables, graphs, models, and algebraic rules, and develop the formal definition of a function. They generate algebraic rules and make predictions based on the situations. Additionally, students connect how a function rule relates to a physical model.

Understand slope and y-intercept

This topic solidifies students' understanding of the concepts of slope and y-intercept. It connects the constant rate of change of a linear function, the slope of the line that is the linear function's graph, and the slope-intercept form for the equation of a line, $y = mx + b$.

Unit 3: Introduction to Sampling and Inference

Probability

In this topic, students investigate simple and compound events using proportional reasoning through several different models. Games of a probabilistic nature are developed as tools to test conjectures and the idea of fairness. Vocabulary and appropriate terminology are emphasized throughout the topic.

Representing and interpreting data

This topic explores visual representations of data, including stem-and-leaf plots, box-and-whisker plots, histograms, bar graphs, and line plots. Students understand a variety of sampling methods and the benefits of each. Students learn that representations can be used to organize data, to compare data sets, and to express an opinion and imply conclusions. Students use data and representations of data to investigate measures of center and variability. They see that representations can be manipulated and learn to carefully analyze the information contained in a graph.

Designing Experiments

This topic explores the use of simulation techniques in probabilistic settings. Students generate results by conducting simulations using coins, spinners, playing cards, number cubes, and other related tools. Solving problems involving real-world situations, students evaluate the reasonableness of their results.

Angles and Triangles

In this topic, students will engage in hands-on investigation of the properties of triangles. Students will also explore numerous angle relationships and use those angle relationships to ask and answer questions in a variety of contexts.

Solving problems with 2-D shapes

In this topic students will expand their understanding of measurement with two-dimensional shapes as they investigate the relationships among circumference, area, radius and diameter in circles. They will also develop the formulas for circumference and area of circles, and areas of special quadrilaterals. They will apply formulas to solve problems in a variety of contexts involving circles and polygons.

Effects of change

In this topic, students explore the effects of proportional change on perimeters and areas of two-dimensional figures and on surface areas and volumes of three-dimensional figures. Students also use estimation to solve problems involving volume and surface area.

Unit 4: Creating, Comparing, and Analyzing Geometric Figures**Transformational geometry and similarity**

This topic introduces coordinate geometry as a tool for exploring transformations. Using ordered pairs to describe reflections, translations, and scaling, students become more adept at solving problems in the coordinate plane.

Pythagorean Theorem

This topic explores proofs of the Pythagorean Theorem and its converse, using concrete models and algebraic representations. Students then solve real-world problems using the Pythagorean Theorem and its converse. Students also apply the Pythagorean Theorem to calculate distance between two points in the coordinate plane.

Exploring geometric relationships

This topic explores lines, transversals, and special angles associated with them. Students learn about properties of corresponding angles, alternate interior angles, and consecutive interior angles formed when parallel lines are cut by a transversal. Students also learn how to use angle congruence to establish that two lines are parallel.

Effects of change

In this topic, students explore the effects of proportional change on perimeters and areas of two-dimensional figures and on surface areas and volumes of three-dimensional figures. Students also use estimation to solve problems involving volume and surface area.

Cylinders, cones, and spheres

This topic builds on students' work with surface area of cylinders and prisms to develop formulas for area, lateral area, surface area, and volume of three-dimensional shapes with curved surfaces, including cones and spheres. By connecting models of cylinders, cones, and spheres to the derivation of these formulas, students deepen their understanding of three-dimensional shapes, and the relationships among these shapes.