



# Curriculum Overview

Subject: Mathematics

Grade: 8

**By the end of the year, you can expect your child to:**

- 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
- 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
- Know and apply the properties of integer exponents to generate equivalent numerical expressions
- Use square root and cube root symbols to represent solutions to equations
- Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used
- Graph proportional relationships, interpreting the unit rate as the slope of the graph
- Compare two different proportional relationships represented in different ways
- Solve linear equations in one variable
- Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions
- Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms
- Analyze and solve pairs of simultaneous linear equations
- 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
- Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations

- Solve real-world and mathematical problems leading to two linear equations in two variables
- Understand that a function is a rule that assigns to each input exactly one output
- Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions)
- 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
- Describe qualitatively the functional relationship between two quantities
- Sketch a graph that exhibits the qualitative features of a function that has been described verbally
- Verify experimentally the properties of rotations, reflections, and translations
- 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
- Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates
- Explain a proof of the Pythagorean Theorem and its converse
- Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two- and three- dimensions
- Apply the Pythagorean Theorem to find the distance between two points in a coordinate system
- Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems
- Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities
- Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association
- Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table