

# Expressions and Equations

In eighth grade, students continue to build versatility with expressions. They apply the properties of integer exponents to recognize, generate, and work flexibly with equivalent expressions. Through this work, they gain an appreciation for the notion that an exponent can be positive or negative (or zero), and they apply the idea in various useful ways. For example, students learn the use of positive and negative powers of 10 to express very large numbers, such as  $2 \times 10^{12}$ , and very small numbers, such as  $2 \times 10^{-12}$ . Students also work with radicals, such as square roots and cube roots.

Students build on previous concepts of unit rates and proportions and continue to develop understanding of how to use linear equations. For example, they will work with systems of linear equations to represent, analyze, and solve a variety of problems.

Additionally, students use similar triangles to explain why the slope  $m$  is the same between any two points on a non-vertical line. They apply this and previous understandings to recognize that the only difference between the lines  $y = mx$  and  $y = mx + b$  is their  $y$ -intercepts.

## The Grade 8 Common Core State Standards for Expressions and Equations specify that students should—

- Work with radicals and integer exponents.
- Understand the connections between proportional relationships, lines, and linear equations.
- Analyze and solve linear equations and pairs of simultaneous linear equations.

The following hands-on activities will help students develop a deeper understanding of expressions and equations. Teachers will want to encourage students to think, in particular, about situations in which inverse-related structures are applied, such as situations involving exponents and radicals. Precision is of special importance as students work with more complex ideas such as these. Teachers will want to quickly address misconceptions.