

## Single-Variable Equations

Students who study single-variable equations are learning to answer the questions

*How is solving an equation different than evaluating an expression?*

*Why could it be advantageous to rewrite a formula to be solved for a different variable?*

*What causes an equation to have no solution or an infinite number of solutions?*

This unit of study addresses Indiana College & Career Ready Standards as follows:

**8.AF.1:** Solve linear equations with rational number coefficients fluently, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. Represent real-world problems using linear equations and inequalities in one variable and solve such problems.

**8.AF.2:** Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by transforming a given equation into simpler forms, until an equivalent equation of the form  $x = a$ ,  $a = a$ , or  $a = b$  results (where  $a$  and  $b$  are different numbers).

**AI.L.1:** Understand that the steps taken when solving linear equations create new equations that have the same solution as the original. Solve fluently linear equations and inequalities in one variable with integers, fractions, and decimals as coefficients. Explain and justify each step in solving an equation, starting from the assumption that the original equation has a solution. Justify the choice of a solution method.

**AI.L.2:** Represent real-world problems using linear equations and inequalities in one variable and solve such problems. Interpret the solution and determine whether it is reasonable.

**AI.L.3:** Represent real-world and other mathematical problems using an algebraic proportion that leads to a linear equation and solve such problems.

**AI.L.9:** Solve absolute value linear equations in one variable.

**AI.L.11:** Solve equations and formulas for a specified variable, including equations with coefficients represented by variables.

Gaining skills in this unit will enable students to do everyday tasks like paying property tax, cutting a pan of brownies, or buying gas for the mower. The specific skills in this unit of study include

- solving one-step equations
- solving two-step equations
- solving multi-step equations
- solving equations with variables on both sides
- manipulating literal equations
- solving proportions
- calculating percent
- calculating percent change