

Before This Module

Grade 6 Module 1

In grade 6, students develop an understanding of a ratio relationship between two quantities and recognize a rate as a ratio relationship. They represent ratio relationships in tables, tape diagrams, double number lines, graphs, and equations in two variables and solve ratio and rate problems. Students also learn to calculate a percent of a quantity as a rate per 100.

Grade 6 Module 4

In grade 6 module 4, students work with algebraic expressions and single-variable equations. They apply the properties of operations to write equivalent expressions. Students develop an understanding of the meaning of a solution. They graph the solution set of an inequality of the form $x > c$ or $x < c$ on a number line. They solve problems by writing and solving equations of the form $x + p = q$ and $px = q$.

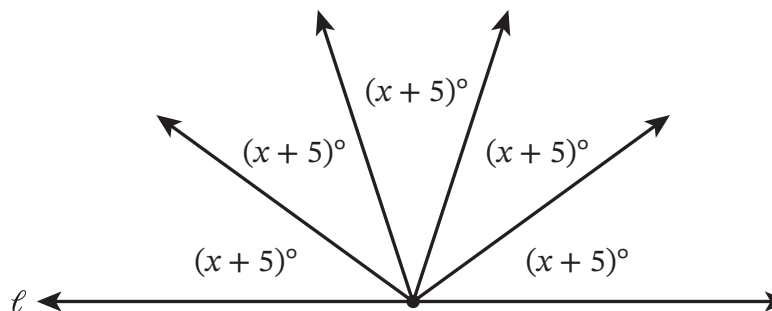
Overview

One- and Two-Variable Equations

Topic A

Solving One-Variable Equations and Inequalities

Students begin the topic by using angle relationships to write and solve equations to determine unknown angle measures. They apply the distributive property to write equivalent algebraic expressions involving rational numbers. Students use if-then moves to solve equations of the forms $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. They then apply this knowledge about solving equations to solve inequalities and graph their solution sets on a number line. Through experimentation, students develop if-then moves for inequalities. At the end of the topic, students use equations to write repeating decimals as fractions.



Topic B

Multi-Step Equations and Their Solutions

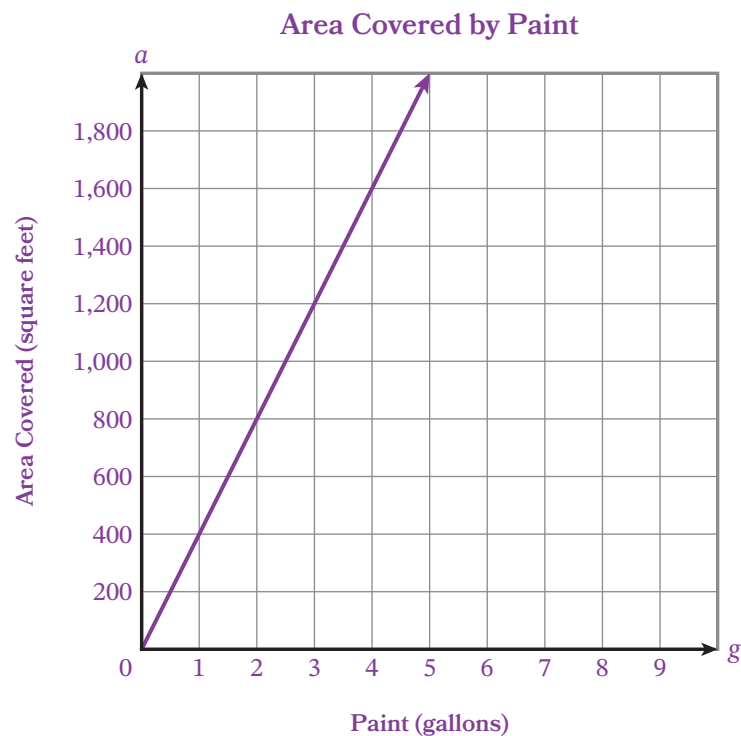
Students formalize the properties of equality and use them to solve linear equations with a variable on both sides of the equation. They also engage in historical mathematics to determine the advantages and disadvantages of presenting problems rhetorically and symbolically. Students discover that linear equations in one variable can have only one solution, infinitely many solutions, or no solution and use the structure of an equation to determine the number of solutions. They write and solve equations to answer questions about consecutive integers and geometric relationships.

Only One Solution	Infinitely Many Solutions	No Solution
$9m - 6 = 6m - 9$ $ax + b = cx + d$	$-4x + 5 = 5 - 4x$ $-(4w - 7) + 3 = 2(5 - 2w)$ $ax + b = ax + b$	$3(4n + 3) - 3n = 2 + 9n - 11$ $10r - 2 = 10r + 1$ $\frac{1}{4}d + 1 + \frac{3}{4}d = d + 5$ $ax + b = ax + d$

Topic C

From Ratio Relationships to Proportional Relationships

Students apply ratio reasoning to recognize that sets of equivalent ratios represent proportional relationships. They identify and represent proportional relationships in tables, graphs, equations, and written descriptions. Students make connections among the different representations of proportional relationships to compare them. They write equations to model constant rate situations and to model part-to-part and part-to-whole ratio relationships. Students end this topic by applying and extending their understanding of proportionality through a modeling task involving a handstand race.



Paint (gallons)	Area Covered (square feet)
0.5	200
4	1,600
2	800

Let g represent the amount of paint in gallons.

Let a represent the area covered in square feet.

$$a = 400g$$

Topic D

Percents and Proportional Relationships

By applying proportional reasoning, students develop an understanding of percents as a rate per 100. They explore how to use equations of the forms $y = kx$ or $\frac{a}{b} = \frac{c}{d}$ to model situations involving percents. Students solve percent problems in a variety of contexts, including commissions, fees, discounts, markups, taxes, tips, simple interest, percent increase, percent decrease, and percent error. By using their understanding of the relationships between part, whole, and percent, students choose which strategy to use to solve percent problems most efficiently.

After This Module

7–8 Module 3

Students apply their understanding of percents and proportional relationships when they solve problems involving scale drawings of geometric figures.

7–8 Module 4

Students apply their understanding of solutions to linear equations to graph linear equations in two variables on the coordinate plane. They use proportional reasoning to develop an understanding of the slope of a line. Students apply their skills in solving linear equations to solve systems of linear equations.

7–8 Module 5

Students apply their knowledge of writing linear equations to write equations that represent linear functions. They use proportional reasoning to calculate the rate of change of a linear function and understand that all proportional relationships are linear functions.

High School: Algebra

High School: Functions

Students extend their understanding of linear equations, percents, and simple interest as they encounter exponential functions and as they model real-world contexts involving compound interest.