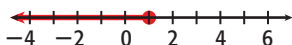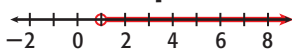# Section Overview

Inequalities

Why? Students must be able to recognize and interpret inequalities before they can solve them and understand how to apply them.

Inequality

$x > 1$

$x \leq 1$

Graph

○ Use an open circle when the graph does not include the point.

● Use a closed circle when the graph includes the point.

Word Phrase	Inequality	Sample Solutions	Solution Set
x is less than 5	$x < 5$	$x = 4$ $4 < 5$ $x = 2.1$ $2.1 < 5$	
a is greater than 0 a is more than 0	$a > 0$	$a = 7$ $7 > 0$ $a = 25$ $25 > 0$	
y is less than or equal to 2 y is at most 2	$y \leq 2$	$y = 0$ $0 \leq 2$ $y = 1.5$ $1.5 \leq 2$	
m is greater than or equal to 3 m is at least 3	$m \geq 3$	$m = 17$ $17 \geq 3$ $m = 3$ $3 \geq 3$	

Section Overview

Addition and Subtraction Inequalities
Lesson 3-6

Why? Many real-world situations can be modeled by inequalities. Examples include describing the temperature needed to prevent a substance from deteriorating, or showing how tall a child must be to ride a specific carnival ride. Students must be able to solve addition and subtraction inequalities to apply their understanding to problem solving.

Solve the inequalities.

$$x + 5 \le -9$$
$$\underline{-5 \quad -5}$$
$$x \qquad \le -14$$

Solve an addition or subtraction inequality as you would solve an equation.

$$6.3 < y - 5.7$$
$$\underline{+5.7 \qquad +5.7}$$
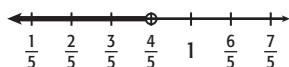$$12 < y$$

Multiplication and Division Inequalities
Lesson 3-7

Why? Solving multiplication and division inequalities prepares students for solving multi-step inequalities.

$$5x < 4$$
$$\frac{5x}{5} < \frac{4}{5}$$
$$x < \frac{4}{5}$$

$$\frac{x}{-2} \le -9$$
$$(-2) \cdot \frac{x}{-2} \ge -9(-2)$$
$$x \ge 18$$

Multiplication or division by a **negative** number reverses the inequality symbol.

Number line: $\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$ 1 $\frac{6}{5}$ $\frac{7}{5}$

Number line: 16 18 20

Solving and Graphing Two-Step Inequalities
Lesson 3-8

Why? To solve some problems, you need to write and solve inequalities.

A T-shirt retailer must pay $120 for a design and $4 per shirt. How many T-shirts would he have to sell at $9 per shirt to make a profit?

$$R > C$$
$$9x > 120 + 4x$$
$$\underline{-4x \qquad -4x}$$
$$5x > 120$$
$$\frac{5x}{5} > \frac{120}{5}$$
$$x > 24$$

He will make a profit if his revenue *R* is greater than his cost *C*.

The retailer would have to sell more than 24 T-shirts to make a profit.

Number line: 22 23 24 25 26 27