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Lesson 3.03 Introduction to Solving Linear Inequalities

Students will be able to:

- ▪ <u>Content Objective:</u> Solve one-step and two-step linear inequalities.

- ▪ <u>Language Objective</u>: Explain whether a number is a solution to an inequality.

Warm Up

Solve the equations below for the given variable.

a. $-3x + 6 = 24$

b. $-5 + \frac{y}{4} = 31$

To solve a linear equation, we use inverse operations. Similarly, we can use inverse operations to solve linear inequalities but before we do, let's review.

Vocabulary Review

For each of the following, identify the inverse.

a. 3

b. -4

c. $\frac{1}{2}$

d. -4

Additive
Inverse: _____

Additive
Inverse: _____

Multiplicative
Inverse: _____

Multiplicative
Inverse: _____

Investigate

Consider the inequality below and perform the following operations to the original inequality by filling in the blanks.
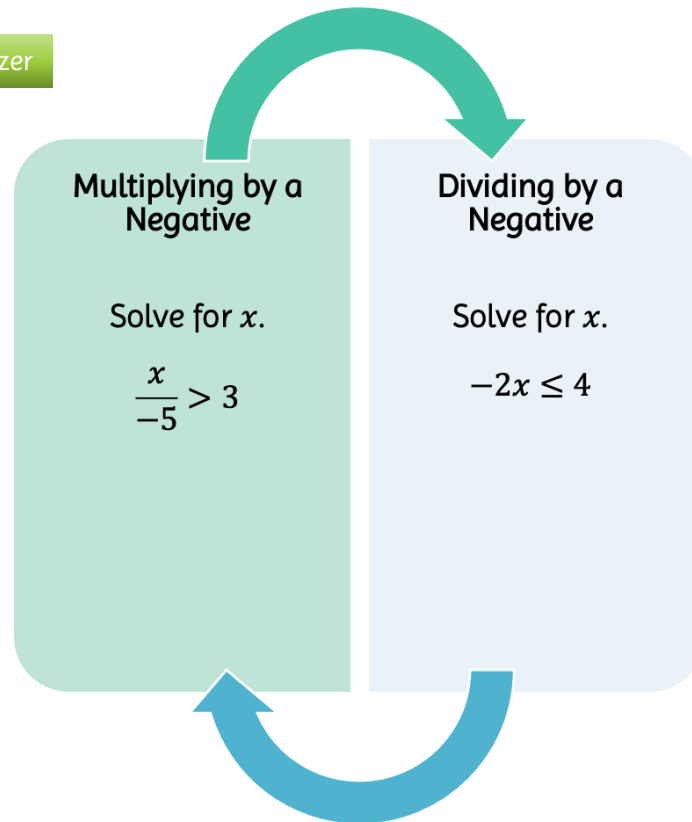
Operation	$4 < 6$	True or False?
Add 2 to both sides	_____ < _____	
Subtract 1 from both sides	_____ < _____	
Multiply both sides by 3	_____ < _____	
Divide both sides by 2	_____ < _____	
Multiply both sides by -1	_____ < _____	
Divide both sides by -2	_____ < _____	

Question:
How can we make the last two inequalities true?

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Graphic Organizer

Multiplying by a Negative	Dividing by a Negative
Solve for x. $$\frac{x}{-5} > 3$$	Solve for x. $$-2x \leq 4$$

Skill 1: One-Step Linear Inequalities

Solve each linear inequality for the given variable.

a. $x - 7 < -4$

b. $-2k \geq -14$

c. $\frac{h}{4} > \frac{1}{2}$

Exercise 1: One-Step Linear Inequalities

Solve each linear inequality for the given variable.

a. $12w \geq -24$

b. $7 < x - 8$

c. $5 > \frac{g}{-3}$

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Skill 2: Two-Step Linear Inequalities

Solve each linear inequality for the given variable.

a. $\dfrac{x}{-4} - 7 < 5$

b. $8 \geq \dfrac{d-4}{3}$

Exercise 2: Two-Step Linear Inequalities

Solve each linear inequality for the given variable.

a. $13 \leq -9x + 13$

b. $\dfrac{1}{3}a - 1 \geq 2$

Skill 3: Variables on Both Sides

Solve the linear inequality below for the given variable.

$$2(x-3) < 5x + 3$$

Is $x = -3$ a solution? Explain.

Exercise 3: Variables on Both Sides

Solve the linear inequality below for the given variable.

$$-2x + 10 \geq -3(4x - 10)$$

Is $x = -1$ is a solution? Explain.

Check Point

Fill in the blank.

When solving linear inequalities, it is important to _____ the inequality symbol when you multiply or divide by a negative number.

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3.03- Problem Set

Name: _____

Solve the linear inequalities below for the given variable.

a. $x - 13 < -17$

b. $-3y \geq -21$

c. $\dfrac{h}{4} > \dfrac{1}{2}$

d. $\dfrac{x}{5} + 4 \leq -6$

e. $\dfrac{x+2}{-3} - 1 < 11$

f. $\dfrac{x}{-7} \leq \dfrac{1}{7}$

g. $-5(x + 2) < 20$

h. $4x + 1 > -9 - x$

i. $-(x + 3) \leq 7(2x - 4)$