Name _____ Date _____

LESSON 5.3

Study Guide

For use with the lesson "Solve Multi-Step Inequalities"

GOAL **Solve multi-step inequalities.**

EXAMPLE 1 Solve a two-step inequality

Solve $-4x + 3 > 15$. Graph your solution.

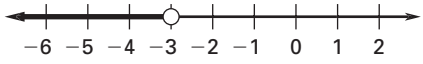
Solution

$-4x + 3 > 15$ Write original inequality.

$-4x > 12$ Subtract 3 from each side.

$x < -3$ Divide each side by -4. Reverse inequality symbol.

The solutions are all real numbers less than -3. Check by substituting a number less than -3 in the original inequality.



CHECK $-4x + 3 > 15$ Write original inequality.

$-4(-5) + 3 \stackrel{?}{>} 15$ Substitute -5 for x.

$23 > 15$ ✓ Solution checks.

Exercises for Example 1

Solve the inequality. Graph your solution.

1. $7x + 8 > 22$ **2.** $-7 \geq -2x + 9$ **3.** $2.3x - 6.9 < 7.13$

EXAMPLE 2 Solve a multi-step inequality

Solve the inequality.

a. $-\frac{1}{3}(x + 12) < 5$ **b.** $9x + 2 < 5x - 18$

Solution

a. $-\frac{1}{3}(x + 12) < 5$ Write original inequality.

$-\frac{x}{3} - 4 < 5$ Distributive property

$-\frac{x}{3} < 9$ Add 4 to each side.

$x > -27$ Multiply each side by -3. Reverse the inequality symbol.

The solutions are all real numbers greater than -27.

b. $9x + 2 < 5x - 18$ Write original inequality.

$9x < 5x - 20$ Subtract 2 from each side.

$4x < -20$ Subtract $5x$ from each side.

$x < -5$ Divide each side by 4.

The solutions are all real numbers less than -5.

LESSON 5.3

Study Guide *continued*

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Exercises for Example 2

Solve the inequality.

4. $3(2x - 7) > 15$

5. $10 - 3x \leq 5x - 14$

6. $\frac{1}{2}(8x + 6) < \frac{1}{3}(9x - 15)$

EXAMPLE 3 Identify the number of solutions of an inequality

Solve the inequality, if possible.

a. $5(3x - 2) < 15x + 7$ **b.** $9 - 28x > 4(5 - 7x)$

Solution

a. $5(3x - 2) < 15x + 7$ Write original inequality.

$15x - 10 < 15x + 7$ Distributive property

$-10 < 7$ Subtract $15x$ from each side.

All real numbers are solutions because $-10 < 7$ is true.

b. $9 - 28x > 4(5 - 7x)$ Write original inequality.

$9 - 28x > 20 - 28x$ Distributive property

$9 > 20$ Add $28x$ to each side.

There are no solutions because $9 > 20$ is false.

Exercises for Example 3

Solve the inequality, if possible.

7. $2m - 7m - 4 > 1 - 5m$

8. $3n - 13 < 3(n - 2)$

9. $11p - 3p + 6 \geq 4(2p - 1)$