

PART I GET STARTED**Today's Mathematics**

Solve multi-step inequalities and recognize special solution sets.

Essential Question

How can equivalent steps reveal one interval, all real numbers, or no solution?

Name _____

Date _____

DO NOW

1. Solve $-4x > 12$.

2. Solve $\frac{y}{3} \leq -2$.

3. Explain why the direction reverses in the first problem but not the second.

SEE IT

Two plans cost $8 + 3n$ and $20 + 2n$ dollars. For which whole numbers of uses $n \geq 0$ is the first plan cheaper?

Quick Write | 2 Minutes

Which equation-solving steps will still work for inequalities? Identify one step that needs special attention.

PART II INVESTIGATE**BUILD THE IDEA**

Uses n	Plan A: $8 + 3n$	Plan B: $20 + 2n$	A cheaper?
0			
8			
12			
15			

1. Solve $8 + 3n < 20 + 2n$. Compare the algebra with the table. Is $n = 12$ included?

2. Simplify $3(x + 2) \leq 3x + 8$. What does the final statement tell you?

3. Simplify $2(x - 1) > 2x + 5$. What does the final statement tell you?

COMPARE AND EXPLAIN

Discuss your rule with a partner. Use a specific value or a number-line model to support it.

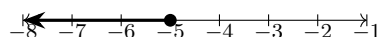
PART III MAKE SENSE AND PRACTICE

WHAT WE CAN CONCLUDE

Distribute, combine like terms, collect variable terms, and isolate the variable. Reverse direction only when multiplying or dividing by a negative. If variable terms cancel, a true statement means all real numbers; a false statement means no solution. Apply contextual restrictions after solving.

WORKED MODEL

$$\begin{aligned} 4 - 2(x + 3) &\geq 8 \\ -2x - 2 &\geq 8 \\ -2x &\geq 10 \\ x &\leq -5 \end{aligned}$$



FOCUSED PRACTICE

Show your steps. Draw requested graphs in the workspace.

1. Solve and graph $3x - 7 < 8$.

2. Solve and graph $5 - 2x \geq 11$.

3. Solve $4(x - 1) \leq 2x + 6$.

4. Solve $2(x + 3) < 2x + 1$.

5. Solve $3(x - 2) \leq 3x + 4$.

6. Three scores are 82, 90, and 88. What fourth score gives a mean of at least 87? Write and solve an inequality.

Math Write | 5 Minutes

When the variable disappears, how do you decide between all real numbers and no solution? Explain with both examples from the investigation.

PART IV PUZZLE PRACTICE

Homework

What do you call a gecko with magical powers?

Complete each exercise. Match its answer to an answer-bank letter. Write that letter in every decoder box bearing the exercise number.

1. $8x - 11 < 13$

2. $3x - 5 \geq 16$

3. $2 - \frac{x}{4} \geq 4$

4. $\frac{6}{7} > -2x - \frac{8}{7}$

5. $4(x + 7) + 4 \leq 4(x + 8)$

6. $4.6 > 1.2 + 1.7x$

7. $8(x - 4) \geq 40$

8. $-30 \leq -\frac{3}{4}(x + 4)$

9. $10x - 6 < 5(2x - 3)$

10. $-6.8 \geq 0.8(x + 1)$

11. $-3x - 24 > -15$

12. $\frac{1}{5}(5x + 5) - 7 > 18$

13. Jeans cost \$10 per pair and shirts cost \$8. With \$100, you buy two pairs of jeans. Solve $8x + 20 \leq 100$ for shirts.

ANSWER BANK

D: $x > -1$

R: $x < 2$

Z: $x < -3$

A: $x \geq 7$

D: $x \leq -9.5$

A: $x \leq -8$

I: $x \leq 36$

A: $x > 24$

I: all real numbers

L: $x \leq 10$

W: no solution

Z: $x < 3$

R: $x \geq 9$

3		13	5	11	2	7	10		9	8	1	12	6	4
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