

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

Use addition and subtraction to produce equivalent inequalities.

Essential Question

Why does adding or subtracting the same number preserve an inequality?

Name _____

Date _____

DO NOW

1. Write an inequality: x is no greater than 4.

2. Graph $x > -1$.

3. Check whether $x = 2$ satisfies $x + 5 \leq 7$.

SEE IT

You have 26 fundraiser sales. The current leader has 41. How many more sales would put you ahead? Write an inequality before solving.

Quick Write | 2 Minutes

Predict what happens to the direction of an inequality when both sides increase by the same amount.

PART II INVESTIGATE**BUILD THE IDEA**

Start	Add -5	Subtract -3	Still true?
$-2 < 4$			
$1 \leq 1$			
$7 > -3$			

1. Use the table to state a rule. Does the sign of the number added matter?

2. Solve $x - 6 \geq -10$. Test the endpoint and a value on each side.

3. Solve $-3 < x + 2$. Rewrite the solution with x on the left, and graph it.

COMPARE AND EXPLAIN

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

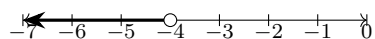
PART III MAKE SENSE AND PRACTICE

WHAT WE CAN CONCLUDE

Adding or subtracting the same number on both sides preserves the direction and the solution set. Inequalities with the same solutions are *equivalent*. Rewriting $-5 < x$ as $x > -5$ changes the order of the expressions, not the relationship.

WORKED MODEL

$$\begin{aligned}x + 7 &< 3 \\x + 7 - 7 &< 3 - 7 \\x &< -4\end{aligned}$$



FOCUSED PRACTICE

Show your steps. Draw requested graphs in the workspace.

1. Solve and graph $p - 9 \geq -4$.
2. Solve and graph $q + 2.5 < 1$.
3. Solve $-6 \leq r - \frac{1}{2}$.
4. Solve $\frac{3}{4} + s > \frac{1}{4}$.
5. An account contains \$120. At least \$35 must remain. Write and solve an inequality for a withdrawal $w \geq 0$.
6. A student changes $x - 8 < 2$ into $x < -6$. Correct the error.

Math Write | 5 Minutes

Explain why subtracting a negative number does not, by itself, reverse an inequality. Include an example.

PART IV PUZZLE PRACTICE

Homework

How do you make a hamburger roll?

Solve each exercise. Match its solution to an answer-bank word. Write the word in the box labeled with its exercise letter.

A. $x + 4 \leq 8$

B. $x + 9 < -5$

C. $x + 12 \geq 21$

D. $x + 8 < -2$

E. $6 > x + \frac{1}{3}$

F. $\frac{11}{8} < x + \frac{3}{8}$

G. $-\frac{4}{7} \geq x - \frac{3}{7}$

H. $x - \frac{8}{9} \geq \frac{10}{9}$

I. $10.1 \geq x + 8.7$

J. $6 < x - 5.6$

ANSWER BANK

$x \geq 9$: TO

$x \leq -\frac{1}{7}$: GIVE

$x > 11.6$: PUSH

$x \leq 1.4$: A

$x \leq 4$: TAKE

$x > 1$: AND

$x \geq 2$: IT

$x < \frac{17}{3}$: HILL

$x < -10$: A

$x < -14$: IT

A	B	C	D	E	F	G	H	I	J
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