Algebra 1 5.3 *7th grade standard

Solve multi-step linear inequalities*

Use the distributive property to solve linear inequalities*

$<$ $>$ $\leq$ $\geq$

order of operations
distributive property
inequality
empty set
all real numbers
Whiteboards
Triangle puzzle

Example 3 Write and Solve an Inequality

Define a variable, write an inequality, and solve the problem.

Five minus 6 times a number is more than four times the number plus 45.

n = a number

$$5 - 6n \geq 4n + 45$$
$$-4n \quad -4n$$
$$5 - 10n \geq 45$$
$$-5 \quad -5$$
$$-10n \geq 40$$
$$\frac{-10n}{-10} \geq \frac{40}{-10}$$
$$n \leq -4$$

$$5 - 6n \geq 4n + 45$$
$$+6n \quad +6n$$
$$5 \geq 10n + 45$$
$$-45 \quad -45$$
$$-40 \geq 10n$$
$$\frac{-40}{10} \geq \frac{10n}{10}$$
$$-4 \geq n$$

GuidedPractice

3. *Two more than half of a number is greater than twenty-seven.*

$$2 + \frac{1}{2}n > 27$$
$$-2 \qquad -2$$
$$\frac{2}{1} \cdot \frac{1}{2}n > 25 \cdot \frac{2}{1}$$
$$n > 50$$

Example 4 Distributive Property

Solve $4(3t - 5) + 7 \geq 8t + 3$. Graph the solution on a number line.

$12t - 20 + 7 \geq 8t + 3$

$12t - 13 \geq 8t + 3$

$-8t \qquad -8t$

$4t - 13 \geq 3$

$+13 \qquad +13$

$4t \geq 16$

$\frac{4t}{4} \geq \frac{16}{4}$

$t \geq 4$

4A. $6(5z - 3) \leq 36z$

$$30z - 18 \leq 36z$$
$$-30z \qquad -30z$$
$$-18 \leq 6z$$
$$\frac{-18}{6} \leq \frac{6z}{6}$$
$$-3 \leq z$$
$$z \geq -3$$

4B. $2(h + 6) > -3(8 - h)$

$2h + 12 > -24 + 3h$

$-2h \qquad -2h$

$12 > -24 + h$

$+24 \qquad +24$

$36 > h$

$h < 36$

$2h + 12 > -24 + 3h$

$-12 \quad -12$

$2h > -36 + 3h$

$-3h \qquad -3h$

$-h > -36$

$\frac{-h}{-1} > \frac{-36}{-1}$

$h < 36$

False = NS

What does it look like when there is no solution to an equation?

What does it look like when the solution is all real numbers?

$$2(x+3) = 2x-5$$
$$2x+6 = 2x-5$$
$$-6 \quad\quad -6$$
$$2x = 2x-11$$
$$-2x \quad -2x$$
$$0 = -11$$

$$2(x-5) = 2x-10$$
$$2x-10 = 2x-10$$
$$+10 \quad\quad +10$$
$$2x = 2x$$
$$-2x \quad -2x$$
$$0 = 0$$

Example 5 Empty Set and All Reals

Solve each inequality. Check your solution.

a. $9t - 5(t - 5) \leq 4(t - 3)$ NS

$9t - 5t + 25 \leq 4t - 12$

$4t + 25 \leq 4t - 12$

$-25 \quad -25$

$4t \leq 4t - 37$

$-4t \quad -4t$

$0 \leq -37$

b. $3(4m + 6) \leq 42 + 6(2m - 4)$

Solve each inequality. Check your solution.

5A. $18 - 3(8c + 4) \geq -6(4c - 1)$

5B. $46 \leq 8m - 4(2m + 5)$