Algebra 1 5.3 *MS 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

$x - 3 = 5$

$+3 \quad +3$

$x = 8$

$2a + 5 = 9$

$-5 \quad -5$

$\frac{2a}{2} = \frac{4}{2}$ $a = 2$

$2(a+7) = -20$

$2a + 14 = -20$

$-14 \quad -14$

$\frac{2a}{2} = \frac{-34}{2}$

$a = -17$

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.

a = a number

$5 - 6a > 4a + 45$

$-4a \quad -4a$

$5 - 10a > 45$

$-5 \quad -5$

$-10a > 40$

$\frac{-10a}{-10} > \frac{40}{-10}$

$a < -4$

GuidedPractice

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

a = a number

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

Example 4 Distributive Property

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

$12t + -20 + 7 \geq 8t + 3$ ✓

$12t - 13 \geq 8t + 3$ ✓

$-3 \quad\quad -3$

$12t - 16 \geq 8t$

$-12t \quad\quad -12t$

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

$4 \leq t$

$t \geq 4$

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

$+13 \quad\quad +13$

$12t \geq 8t + 16$

$-8t \quad\quad -8t$

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

$t \geq 4$

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

$30z + 18 \leq 36z$

$-30z \qquad -30z$

$\frac{-18}{6} \leq \frac{6z}{6}$

$-3 \leq z \rightarrow z \geq -3$

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

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

$-2h \quad\quad -2h$

$12 > -24 + h$

$+24 \quad +24$

$36 > h$

$h < 36$

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

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

$2h+3=2(h+5)$

$2h+3=2h+10$

$-2h \quad -2h$

$3=10$

F → N.S.

$3x+15=3(x+5)$

$3x+15=3x+15$

$-3x \quad -3x$

$15=15$

T → all nums.

Example 5 Empty Set and All Reals

Solve each inequality. Check your solution. → No Solution

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

NS

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

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

$-4t \qquad -4t$

$25 \leq -12$ F

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

$12m + 18 \leq 42 + 12m - 24$

$12m + 18 \leq 12m + 18$

$-12m \quad -12m$

$18 \leq 18$

T = all numbers

Solve each inequality. Check your solution.

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

$18 - 24c - 12 \geq -24c + 6$

$6 - 24c \geq -24c + 6$

$-6 \qquad\qquad -6$

$0 - 24c \geq -24c$

$+24c \qquad +24c$

$0 \geq 0$

T: all numbers
all real

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

$46 \leq 8m + -8m + -20$

$+20 \qquad\qquad +20$

$66 \leq 8m + -8m$

$66 \leq 0$

F: NS