

Name: _____

Date: _____

2-9 Solving Linear Inequalities

AIM: How can we express an inequality statement in multiple ways?

Warm Up: Determine whether the following equation has one solution, infinite solution, or no solution. Justify your reasoning.

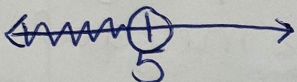
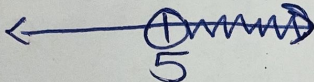
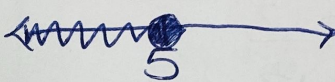
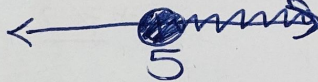
$$2(2x + 5) = 4x + 10$$

$$\begin{array}{r} 4x + 10 = 4x + 10 \\ \underline{-4x} \quad \underline{-4x} \end{array} \Rightarrow \text{(Notice they're the same!)}$$

$$10 = 10$$

Infinite Solutions

Interval Notation vs. Graphically on a Number line

Less than	More than	Less than or equal to	Greater than or equal
$x < 5$	$x > 5$	$x \leq 5$	$x \geq 5$
			

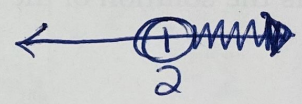
Exercise 1:

$$5x + 10 > 20$$

$$\underline{-10} \quad \underline{-10}$$

$$\frac{5x}{5} > \frac{10}{5}$$

$$x > 2$$



When you multiply or divide by a Negative number, we FLIP the inequality symbol

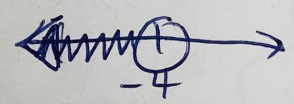
Exercise 2

$$-6y + 2 > 26$$

$$\underline{-2} \quad \underline{-2}$$

FLIP \rightarrow $\frac{-6y}{-6} > \frac{24}{-6}$

$$y < -4$$



Exercise 3

$$\frac{x}{3} + 8 \neq 9$$

Exercise 4

$$4(x - 3) \geq 2(x - 2)$$

$$4x - 12 \geq 2x - 4$$

$$\underline{-2x} \quad \underline{-2x}$$

$$2x - 12 \geq -4$$

$$\underline{+12} \quad \underline{+12}$$

$$\frac{2x}{2} \geq \frac{8}{2}$$

$$x \geq 4$$

Problem Set: Express your solution set in interval notation and graphically, on a number line.

1) $-6(x-5) \geq 30$

$$\begin{array}{r} -6x + 30 \geq 30 \\ \underline{-30} \quad \underline{-30} \end{array}$$

$$\begin{array}{r} -6x \geq 0 \\ \underline{-6} \quad \underline{-6} \end{array}$$

$x \leq 0$



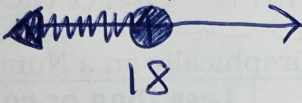
* Flip inequality b/c we divided by a negative!

2) $\frac{1}{3}x - 4 \leq 2$

$$\begin{array}{r} +4 \quad +4 \end{array}$$

$\frac{1}{3}x \leq 6$ (3)

$x \leq 18$



3) $-1.6(x+2) \leq 9.8$

$$\begin{array}{r} -1.6x - 3.2 \leq 9.8 \\ \underline{+3.2} \quad \underline{+3.2} \end{array}$$

$$\begin{array}{r} -1.6x \leq 13 \\ \underline{-1.6} \quad \underline{-1.6} \end{array}$$

$x \geq -8.125$

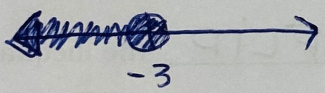
* Divide by Neg, Flip inequality.

4) What is the solution of the inequality $-6x - 17 \geq 8x + 25$

$$\begin{array}{r} \underline{-8x} \quad \underline{-8x} \\ -14x - 17 \geq 25 \\ \underline{+17} \quad \underline{+17} \end{array}$$

$$\begin{array}{r} -14x \geq 42 \\ \underline{-14} \quad \underline{-14} \end{array}$$

$x \leq -3$



* move all variables to left, constants to right.

← Flip!

5) Which number is in the solution set of the inequality $6x + 2 < 8x + 14$

- a) -7
- b) -6
- c) -5
- d) -10

$x > -6$
so which # is GREATER THAN -6??

$$\begin{array}{r} \underline{-8x} \quad \underline{-8x} \\ -2x + 2 < 14 \\ \underline{-2} \quad \underline{-2} \end{array}$$

$$\begin{array}{r} -2x < 12 \\ \underline{-2} \quad \underline{-2} \end{array}$$

← FLIP!

$x > -6$

Real World Application of Inequalities

Scenario	Inequality in set notation	Graphically on a number line
You must be 4ft or taller to ride the roller coaster	$x \geq 4$	