TOPIC: LINEAR INEQUALITIES

Interval Notation

- Instead of set notation, a more compact way to express solution sets is in **interval notation**.

$\{x \mid -13 < x \leq 9\}$

$(-13, 9]$

	CLOSED INTERVAL		OPEN INTERVAL		HALF CLOSED/ OPEN INTERVAL
	endpoint				
Set Notation	$\{x \mid 0 \leq x \leq 5\}$	$\leq$	$\{x \mid 0 < x < 5\}$	$<$	$\{x \mid 0 \leq x < 5\}$
Interval Notation	[___ , ___]	[	(___ , ___)	(	________
Number Line		●		o	
	• Endpoints ___cluded		• Endpoints ___cluded		

EXAMPLE: Express the set in interval notation & graph on a number line.

$\{x \mid x \geq 3\}$

____

- When solution sets have no "end point," we use infinity symbols ______ and _______.
  - In interval notation, *always* express ∞ with _________ bounds.

PRACTICE: Express the given set in interval notation and graph.

$\{x \mid 14 \leq x < 26\}$

____

PRACTICE: Express the given interval in set builder notation and graph.

$(-\infty, 0]$

____

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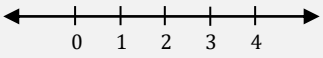
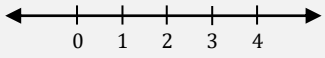
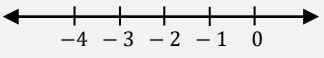
PRACTICE: Express the given set in interval notation and graph.

$\{x \mid x \leq 7\}$

_____

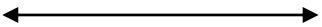
Solving Linear Inequalities

- Linear inequalities are just linear equations with an _____ symbol instead of an **=** sign!
  - You can apply ***everything*** from solving linear equations to linear inequalities.

Linear Equation	**Linear Inequality**	
$2x - 6 = 0$	$2x - 6 \leq 0$	$-2x - 6 \leq 0$
$+6 \quad +6$		$+6 \quad +6$
$\frac{2x}{2} = \frac{6}{2}$		$-2x \leq 6 \qquad -2x \leq 6$
$x = 3$		
		
	_____	_____
Solution: _____ value	Multiplying/Dividing by a **negative** # _____ the symbol. Solution: _____ of values	

PRACTICE: Solve the inequality. Express the solution set in interval notation and graph.

$2x + 12 > 19$



TOPIC: LINEAR INEQUALITIES

Fractions & Variables on Both Sides

- Solve *inequalities* with **fractions** and/or **variables on both sides** of the symbol just as you would a linear *equation*.

EXAMPLE**:** Solve the inequality. Express the solution set in interval notation and graph.

$$\frac{1}{4}(x+2) \geq -\frac{1}{12} - \frac{1}{3}x$$

PRACTICE**:** Solve the inequality. Express the solution set in interval notation and graph.

$$\frac{1}{3}(x+1) \geq \frac{1}{5}(3+2x)$$