

Essential Question: How do we solve and graph simple inequalities?

Do Now:

Remember:

An inequality is a statement, using an inequality symbol, that compares two expressions that are not equal.

Inequalities

$>$ greater than	\circ
$<$ less than	\circ
\geq greater than or equal to	\bullet
\leq less than or equal to	\bullet



Graph the following inequalities.

	Graph of Solution Set	State a possible solution.
$x > 7$		8
$x \leq -6$		-9

**Think about this...**

Are there other ways to describe the solution set to an inequality?

Interval Notation(means "not included" \circ [means "included" \bullet **Remember.** ∞ and $-\infty$ always use (

Using interval notation, state the solution set of the above inequalities.

$$x > 7 \quad (7, \infty)$$

$$x \leq -6 \quad (-\infty, -6]$$

Solving Simple Inequalities

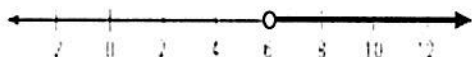
$$6x - 7 > 2x + 17$$

$$+7 \quad +7 \leftarrow \text{addition of inequality prop.}$$

$$6x > 2x + 24$$

$$4x > 24$$

$$x > 6$$



A solution to an inequality is any value, when replaced by the variable, makes the inequality true.

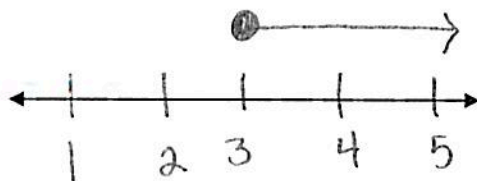
- Use properties of inequality to solve.
- When *multiplying* or *dividing* both sides of an inequality by a *negative number*, "flip" the inequality sign in order to make the statement true.
- Represent the solution set to the inequality on a number line.

Determine the solution set to each inequality, graph on the number line and state the solution in interval notation.

1. $x + 4 \geq 7$

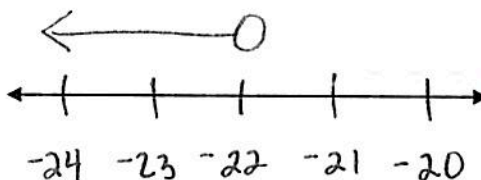
$$x \geq 3$$

$$[3, \infty)$$



2. $\left(-\frac{x}{2}\right)(11) - 2$

$$x < -22 \quad (-\infty, -22)$$



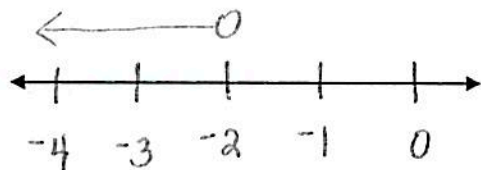
Solving and Graphing Multi-step Inequalities

Determine the solution set to the inequality. Represent the solution set on a number line.

3. $-2x + 3 > 7$

$$-2x > 4$$

$$x < -2$$

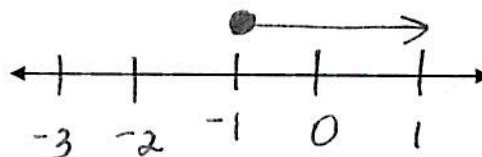


4. $4x - 8 \leq 8x - 4$

$$-4x - 8 \leq -4$$

$$-4x \leq 4$$

$$x \geq -1$$



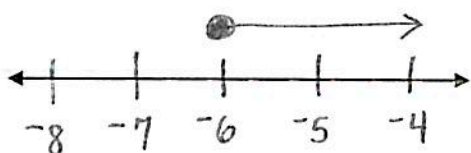
$$5. -2(c+4) - 1 \leq 3$$

$$-2c - 8 - 1 \leq 3$$

$$-2c - 9 \leq 3$$

$$-2c \leq 12$$

$$c \geq -6$$

 $[-6, \infty)$


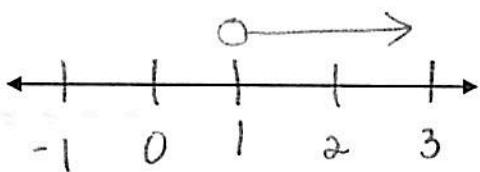
$$7. [-.01x - .03 > .02 - .01(2x+4)] 100$$

$$-x - 3 > 2 - 1(2x+4)$$

$$-x - 3 > 2 - 2x - 4$$

$$-x - 3 > -2x - 2$$

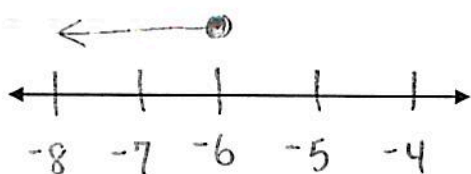
$$x - 3 > -2 \quad x > 1$$

 $(1, \infty)$


$$9. 8y + 4 \leq 7y - 2$$

$$y + 4 \leq -2$$

$$y \leq -6$$

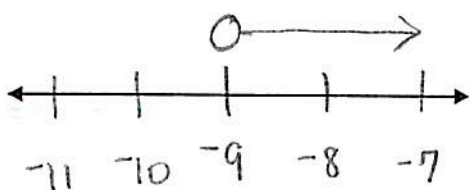
 $(-\infty, -6]$


$$11. 6a - 5 < 7a + 4$$

$$-a - 5 < 4$$

$$-a < 9$$

$$a > -9$$

 $(-9, \infty)$


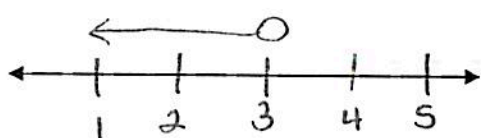
$$6. 3y + 7 > 6(y - 2) + 10$$

$$3y + 7 > 6y - 12 + 10$$

$$3y + 7 > 6y - 2$$

$$-3y + 7 > -2$$

$$-3y > -9 \quad y < 3$$

 $(-\infty, 3)$


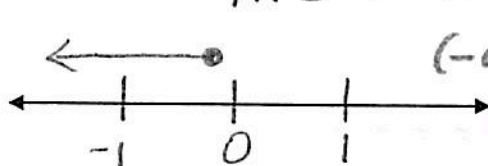
$$8. \left[\frac{x+2}{3} + \frac{5x}{6} \leq \frac{1}{2} \right] 6 \quad \text{LCD} = 6$$

$$2(x+2) + 5x \leq 3$$

$$2x + 4 + 5x \leq 3$$

$$7x + 4 \leq 3$$

$$7x \leq -1 \quad x \leq -\frac{1}{7}$$

 $(-\infty, -\frac{1}{7}]$


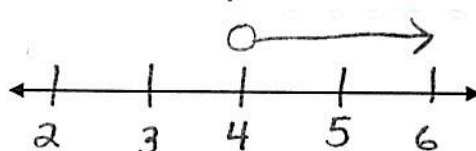
$$10. 4(x - 3) > 2(x - 2)$$

$$4x - 12 > 2x - 4$$

$$2x - 12 > -4$$

$$2x > 8$$

$$x > 4$$

 $(4, \infty)$


$$12. 13x \leq 9(1 - x)$$

$$13x \leq 9 - 9x$$

$$22x \leq 9$$

$$x \leq \frac{9}{22}$$

 $(-\infty, \frac{9}{22}]$
