

**AIM:** 6-3 I will be able to solve inequalities and graph the solution on a number line!

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Date Key  
Math 6

**Warm-up:** Which of the following numbers is a solution to the inequality below?

$$y - 8 > 15$$

- a) 23
- b) 24
- c) 22
- d) -23

check each  
choice!

$$24 - 8 > 15$$

$$16 > 15$$



**Let's Investigate:** How is solving inequalities similar to solving equations?

We solve inequalities the **SAME** way we solve equations. We isolate the variable by using inverse operations, and the equal sign is replaced with the **INEQUALITY** signs below!

< less than

≤ less than or equal to

> greater than

≥ greater than or equal to

**Example:**

**SOLVE**

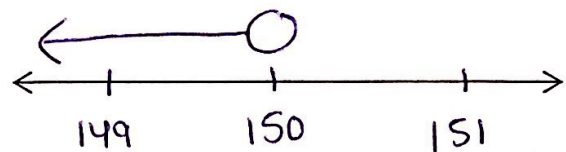
$$\frac{x}{5} - 5 < 25$$

$$\frac{x}{5} \quad | \quad +5$$

$$\frac{x}{5} < 30$$

$$x < 150$$

**GRAPH INEQUALITY**



**CHECK:** Choose a number that satisfies the inequality.

pick # < 150

let  $x = 100$

$$\frac{100}{5} - 5 < 25$$

$$20 - 5 < 25$$

$$15 < 25 \text{ true!}$$

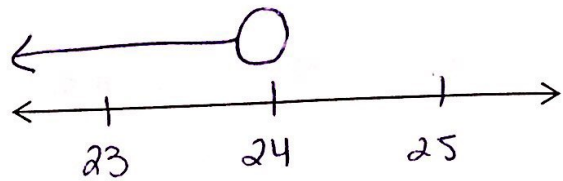
Now You Try! THE VARIABLE SHOULD ALWAYS BE ON THE LEFT SIDE!!

1) SOLVE

$$8 \cdot \frac{x}{8} < 3 \cdot 8$$

$$x < 24$$

GRAPH INEQUALITY



CHECK: Choose a number that satisfies the inequality. let  $x = 16$

$$\frac{16}{8} < 3$$

$$2 < 3 \quad \checkmark \text{ true!}$$

2) SOLVE

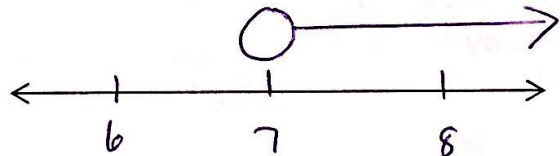
$$2x + 6 > 20$$

$$\begin{array}{r} -6 \quad -6 \\ \hline 2x + 6 > 20 \\ \hline 2x > 14 \end{array}$$

$$\frac{2x}{2} > \frac{14}{2}$$

$$x > 7$$

GRAPH INEQUALITY



CHECK: Choose a number that satisfies the inequality. let  $x = 8$

$$2 \cdot 8 + 6 > 20$$

$$16 + 6 > 20$$

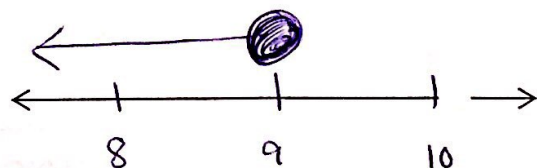
$$22 > 20 \quad \text{true!}$$

3) SOLVE

$$\frac{5w}{5} \leq \frac{45}{5}$$

$$w \leq 9$$

GRAPH INEQUALITY



CHECK: Choose a number that satisfies the inequality. let  $w = 9$

$$5 \cdot 9 \leq 45$$

$$45 \leq 45 \quad \checkmark$$

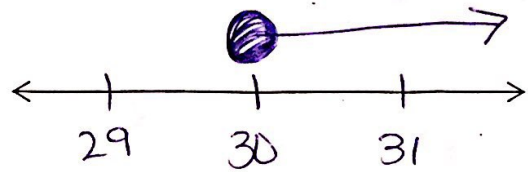
true!

AIM: 6-3 I will be able to solve inequalities and graph the solution on a number line!

4) SOLVE

$$\begin{array}{r} x \\ \frac{x}{2} - 3 \geq 12 \\ \hline +3 \quad +3 \\ \hline x \geq 30 \end{array}$$

GRAPH INEQUALITY



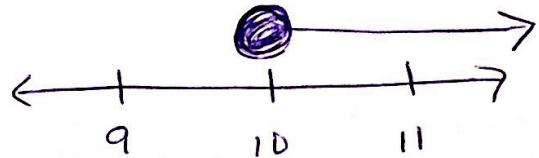
CHECK: Choose a number that satisfies the inequality. Let  $x = 30$

$$\begin{aligned} \frac{30}{2} - 3 &\geq 12 \\ 15 - 3 &\geq 12 \\ 12 &\geq 12 \quad \checkmark \text{ true!} \end{aligned}$$

5) SOLVE

$$\begin{array}{r} 4x - 10 \geq 30 \\ \hline +10 \quad +10 \\ \hline 4x \geq 40 \\ \hline \frac{4x}{4} \geq \frac{40}{4} \\ x \geq 10 \end{array}$$

GRAPH INEQUALITY



CHECK: Choose a number that satisfies the inequality. Let  $x = 10$

$$\begin{aligned} 4 \cdot 10 - 10 &\geq 30 \\ 40 - 10 &\geq 30 \\ 30 &\geq 30 \quad \checkmark \text{ true!} \end{aligned}$$

6) Consider the inequality:

$$2x + 5.5 < 20$$

Methods?

Solve or plug

Select TWO values of  $x$  that would make the inequality true.

a)  $\frac{9}{4} = 2\frac{1}{4}$

d) 7.25

b)  $\frac{19}{2} = 9\frac{1}{2}$

e) 8.5

c) 5

$$\begin{array}{r} 2x + 5.5 < 20 \\ -5.5 \quad -5.5 \\ \hline 2x < 14.5 \\ \hline \frac{2x}{2} < \frac{14.5}{2} \end{array}$$

$$x < \frac{14.5}{2}$$

$$x < 7.25$$

$$\begin{array}{r} 7.25 \\ 2 \overline{) 14.50} \\ \underline{-4} \phantom{0} \\ 10 \phantom{0} \end{array}$$