

Solving and Graphing Inequalities

Date: 11-13-12

Objective: Today we will apply inverse operations in order to solve inequalities and graph their solutions.

Notes:

Recall:

When graphing inequalities on a number line, we use:

a closed point ● when

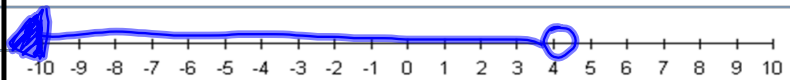
we see \leq or \geq

an open point ○ when

we see $<$ or $>$

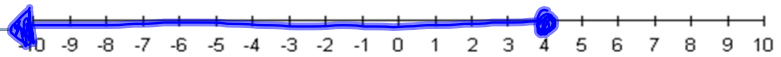
Example: $x < 4$

$$-1 < 4 \checkmark$$



Example: $x \leq 4$

$$4 \leq 4 \checkmark$$
$$0 \leq 4 \checkmark$$



Now we will solve one- and two-step inequalities through inverse operations.

We will graph their solutions on a number line.

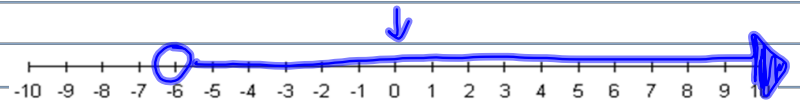
1. Solve
2. Graph
3. Check

Example: One-Step Inequality

$$x + 5 > -1$$

$\begin{array}{r} -5 \quad -5 \\ \hline x > -6 \end{array}$

← Check
 $x = 0$
 $0 + 5 > -1$
 $\checkmark 5 > -1$

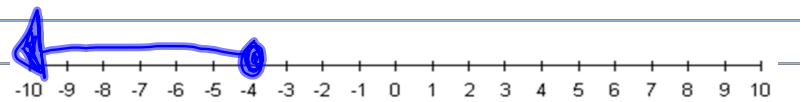


Example: Two-Step Inequality

$$2n + 5 \leq -3$$

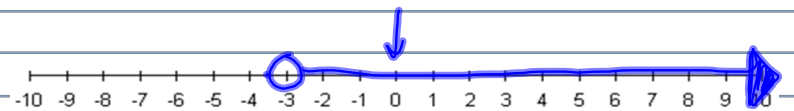
$\begin{array}{r} -5 \quad -5 \\ \hline 2n \leq -8 \\ \frac{2n}{2} \leq \frac{-8}{2} \\ n \leq -4 \end{array}$

Check
 $n = -10$
 $2(-10) + 5 \leq -3$
 $-20 + 5 \leq -3$
 $-15 \leq -3$
 \checkmark



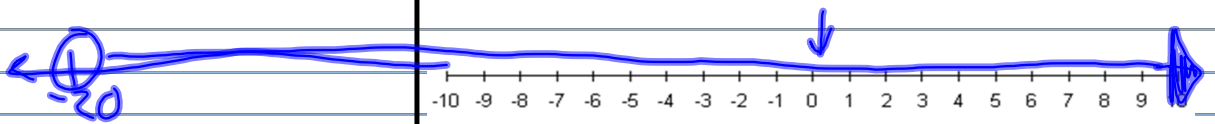
Example: Dividing by a Negative

$$\begin{array}{r} -2n < 6 \\ \underline{-2 \mid -2} \\ n > -3 \end{array} \quad \begin{array}{l} \text{Check} \\ -2(0) < 6 \\ 0 < 6 \end{array}$$



Example: Multiplying by a Negative

$$\begin{array}{r} x < 5 \\ \underline{-4} \\ x \div -4 < 5 \\ \underline{x-4 \mid x-4} \\ x > -20 \end{array} \quad \begin{array}{l} \text{Check} \\ x=0 \\ \frac{0}{-4} < 5 \\ 0 < 5 \end{array}$$

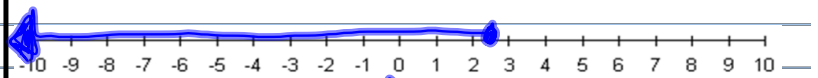


Example: Two-Step with a Negative

$$\begin{array}{r}
 -2x + 1 \geq -4 \\
 \quad \quad \quad \begin{array}{cc} -1 & -1 \\ \hline \end{array} \\
 \hline
 -2x \geq -5 \\
 \quad \quad \quad \begin{array}{c} -2 \downarrow -2 \\ \hline \end{array} \\
 x \leq 2.5
 \end{array}$$

Check

$$\begin{array}{l}
 x=0 \quad -2(0) + 1 \geq -4 \\
 \quad \quad \quad 0 + 1 \geq -4 \\
 \quad \quad \quad 1 \geq -4 \quad \checkmark
 \end{array}$$



* What happens to the inequality when dividing or multiplying by a negative? *

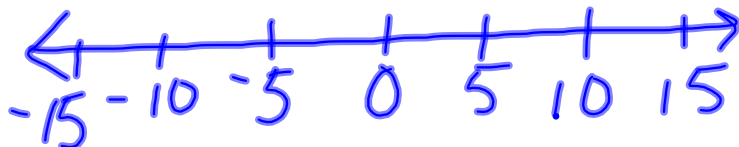
It reverses it.

$$\begin{array}{ccc}
 < \longrightarrow > & \geq \longleftrightarrow \leq \\
 > \longrightarrow < & \leq \longleftrightarrow \geq
 \end{array}$$

Exit Ticket

Solve the inequalities
and graph.

$$\textcircled{1} 2x - 1 > -11$$



$$\textcircled{2} -7n \leq 21$$

