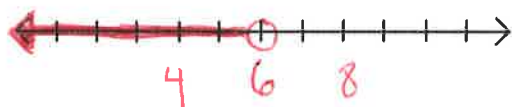


2.2 Solving Inequalities by Adding & Subtracting

Example 1: Solve the inequality. Then, graph the solutions.

a.) $x + 9 < 15$

$$\begin{array}{r} -9 \quad -9 \\ \hline x < 6 \end{array}$$



b.) $d - 3 > -7$

$$\begin{array}{r} +3 \quad +3 \\ \hline d > -4 \end{array}$$



c.) $2 \geq x + 8$

*variable must be on left to graph

$$\begin{array}{r} -8 \quad -8 \\ \hline -6 \geq x \\ x \leq -6 \end{array}$$

switch sides & flip sides



d.) $-5 \leq 6 + x$

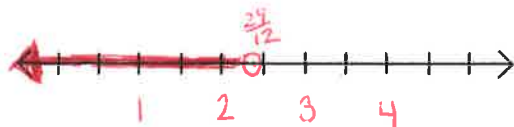
$$\begin{array}{r} -6 \quad -6 \\ \hline -11 \leq x \\ x \geq -11 \end{array}$$

rewrite!



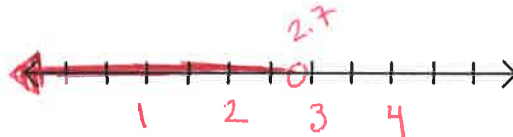
d.) $x - \frac{3}{4} < \frac{5}{3}$

$$\begin{array}{r} +\frac{3}{4} \quad +\frac{3}{4} \\ \hline x < \frac{29}{12} \quad 2.4 \end{array}$$



e.) $-2.5 + x < -5.2$

$$\begin{array}{r} +2.5 \quad +2.5 \\ \hline x < -2.7 \end{array}$$



Example 2: Josh can bench press 220 lbs. He wants to bench press at least 250 lbs. Write and solve an inequality to determine how many more pounds Josh must lift to reach his goal.

x : # of lbs Josh Needs

$$\begin{array}{r} 220 + x \geq 250 \\ -220 \quad -220 \\ \hline x \geq 30 \end{array}$$

30 lbs or more

Example 3: Mrs. Johnson wants to buy an antique bracelet at an auction. She is willing to bid no more than \$550. So far, the highest bid is \$475. Write and solve an inequality to determine the amount Mrs. Johnson can add to the bid.

x : amount to add to bid

$$\begin{array}{r} 475 + x \leq 550 \\ -475 \quad -475 \\ \hline x \leq 75 \end{array}$$

She can bid \$75 or less

Example 4: Write an inequality to represent each statement. Then, solve and graph the solutions.

a.) 8 less than a number is greater than 4

$$\begin{array}{r} n - 8 > 4 \\ +8 \quad +8 \\ \hline n > 12 \end{array}$$



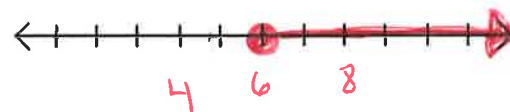
b.) A number increased by 5 is less than -6

$$\begin{array}{r} n + 5 < -6 \\ -5 \quad -5 \\ \hline n < -11 \end{array}$$



c.) 4 more than a number is greater than or equal to 10

$$\begin{array}{r} 4 + n \geq 10 \\ -4 \quad -4 \\ \hline n \geq 6 \end{array}$$



2.3 Solving Inequalities by Multiplying or Dividing

RULE: When you multiply or divide by a negative number, reverse the inequality sign.

flip it!

Example 1: Solve the inequality. Then, graph the solutions.

a.) $\frac{4x}{4} < \frac{16}{4}$
 $x < 4$



b.) $\frac{-4x}{-4} < \frac{16}{-4}$
 $x > -4$

Flip inequality b/c dividing by neg number



c.) $\frac{-20}{2} \leq \frac{2x}{2}$
 $-10 \leq x$ *rewrite w/ variable on left*
 $x \geq -10$



d.) $\frac{-32}{-8} > \frac{-8x}{-8}$ *flip!*
 $4 < x$ *rewrite*
 $x > 4$

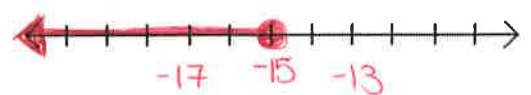


e.) $\frac{5}{5} \cdot \frac{x}{5} \leq -3 \cdot \frac{5}{5}$
 $x \leq -15$

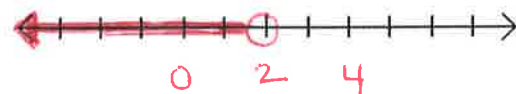


f.) $\frac{2}{3}x \geq 10 \cdot \frac{-3}{2}$
 $x \leq -15$

Multiply by reciprocal



g.) $\frac{4}{5} > \frac{2}{5}x \cdot \frac{5}{2}$
 $2 > x$ *rewrite!*
 $x < 2$



h.) $\frac{3x}{3} > -\frac{1}{2} \cdot \frac{3}{3}$
 $x > -\frac{1}{6}$



Example 2: Ryan has a \$16 gift card to Smoothie King. Smoothies cost \$2.50 with tax. Write and solve an inequality to find out how many smoothies Ryan can buy.

x : # of smoothies

$$\frac{2.50x}{2.50} \leq \frac{16}{2.50}$$
$$x \leq 6.4$$

Ryan can buy 6 smoothies at most

Example 3: A pitcher can hold 128 ounces of juice. What are the possible number of 10 oz servings that one pitcher can fill?

x : # of 10oz servings

$$\frac{10x}{10} \leq \frac{128}{10}$$
$$x \leq 12.8$$

you can fill at most 12 cups

Example 4: Write an inequality for each statement. Then, solve and graph the solutions.

a.) The product of x and 7 is less than 42.

$$\frac{7x}{7} < \frac{42}{7}$$
$$x < 6$$



b.) The quotient of x and 8 is at least 3.

$$8 \cdot \frac{x}{8} \geq 3 \cdot 8$$
$$x \geq 24$$



c.) 8 is no more than the quotient of x and -2.

$$-2 \cdot 8 \leq \frac{x}{-2} \cdot -2$$
$$-16 \geq x$$
$$x \leq -16$$

