

Is each number a solution to this inequality?

$$2m - 5 < 17$$

You could substitute each value for m and see if you get a true statement.

1. -12

$$\begin{aligned} 2(-12) - 5 &< 17 \\ -24 - 5 &< 17 \\ -29 &< 17 \end{aligned} \quad \text{Yes}$$

2. 11

$$\begin{aligned} 2(11) - 5 &< 17 \\ 22 - 5 &< 17 \\ 17 &< 17 \end{aligned} \quad \text{NO}$$

3. 10

$$\begin{aligned} 2(10) - 5 &< 17 \\ 20 - 5 &< 17 \\ 15 &< 17 \end{aligned} \quad \text{Yes}$$

Or you could solve the inequality and see if each value is part of the solution.

$$\begin{aligned} 2m - 5 &< 17 \\ +5 & \quad +5 \\ \hline 2m &< 22 \\ \frac{2m}{2} &< \frac{22}{2} \\ m &< 11 \end{aligned}$$

1. -12 Yes, -12 is less than 11

2. 11 No, 11 is not less than 11

3. 10 Yes, 10 is less than 11

Show on a number line all the value of Q that meet the following condition:

$$Q > 3$$

AND

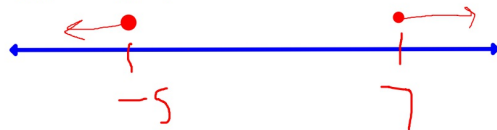
$$Q < 10$$



this inequality represents everything between 3 and 10.

Show on a number line all the value of Q that meet the following condition:

$$M \leq -5 \quad \text{OR} \quad M \geq 7$$



You can now finish Hwk #16 -- Due Thursday

To solve inequalities you take the same steps to get the variable by itself that you would if the problem had an = sign instead.

Find the exact solution.

$$4 - 3(k + 2) + 8k < 2k + 12$$

$$\underline{4} - \underline{3k} - \underline{6} + \underline{8k} < 2k + 12$$

$$\begin{array}{rcl} 5k - 2 & < & 2k + 12 \\ -2k & & -2k \end{array}$$

$$k < \frac{14}{3}$$

$$\begin{array}{rcl} 3k - 2 & < & 12 \\ +2 & & +2 \end{array}$$

$$\frac{3k}{3} < \frac{14}{3}$$

Ticket Sales Suppose your school plans a musical. The director's goal is ticket sales of at least \$4000. Adult tickets are \$5.00 and student tickets are \$4.00. Let a represent the number of adult tickets and s represent the number of student tickets. Write an inequality that represents the director's goal.

$$5a + 4s \geq 4000$$

Solve and graph the solution:

$$7 - 2x > 23$$

Check your answer.

check your answer: Pick any number greater than -8: try 0

$$\begin{array}{l} 7 - 2(0) > 23 \\ 7 - 0 > 23 \\ 7 > 23 \text{ This is NOT true!!} \end{array}$$

If you test a number greater than -8 you find that the original inequality isn't true. Therefore, $x > -8$ is NOT the solution!

$$\begin{array}{rcl} -7 & & -7 \\ -2x & > & 16 \\ -2 & & -2 \end{array}$$

$$x > -8$$

1. Pick two numbers and place them on either side of the circle.

$$\underline{7} \quad \bigcirc \quad \underline{21}$$

$+6 \qquad +6$

2. Place either < or > in the circle to make a correct statement

3. Pick another number and add that to both numbers and place the results on either side of the circle.

add 6 to both sides

$$\underline{13} \quad \bigcirc \quad \underline{27}$$

4. Place either < or > in the circle to make a correct statement

How does adding the same number to both sides of an inequality affect the direction of the inequality symbol?

The inequality remains the same

5. Pick two numbers and place them on either side of the circle.

$$\begin{array}{ccc} 3 & & 6 \\ \hline -5 & & -5 \end{array} \quad \bigcirc$$

6. Place either < or > in the circle to make a correct statement

7. Pick another number and subtract it from both numbers and place the results on either side of the circle. subtract 5 from both sides

$$\begin{array}{ccc} -2 & & 1 \\ \hline & & \end{array} \quad \bigcirc$$

8. Place either < or > in the circle to make a correct statement

How does subtracting the same number from both sides of an inequality affect the direction of the inequality symbol?

The inequality remains the same

9. Pick two numbers and place them on either side of the circle.

$$\begin{array}{ccc} 16 & & 36 \\ \hline \times 2 & & \times 2 \end{array} \quad \bigcirc$$

10. Place either < or > in the circle to make a correct statement

11. Pick a positive number and multiply both numbers by that number and place the results on either side of the circle. multiply both sides by 2

$$\begin{array}{ccc} 32 & & 72 \\ \hline & & \end{array} \quad \bigcirc$$

12. Place either < or > in the circle to make a correct statement

How does multiplying both sides of an inequality by a positive number affect the direction of the inequality symbol?

The inequality remains the same

13. Pick two numbers and place them on either side of the circle.

$$\frac{10}{x-5} < \frac{50}{x-5}$$

14. Place either < or > in the circle to make a correct statement

15. Pick a negative number and multiply both numbers by that number and place the results on either side of the circle. Multiply both sides by -2

$$\frac{-50}{x-5} > \frac{-250}{x-5}$$

16. Place either < or > in the circle to make a correct statement

How does multiplying both sides of an inequality by a negative number affect the direction of the inequality symbol?

The inequality changes direction...IT FLIPS

The following steps DON'T affect the direction of the inequality:

- Adding the same number to both sides
- Subtracting the same number from both sides
- Multiplying both sides by the same positive number
- Dividing both sides by the same positive number

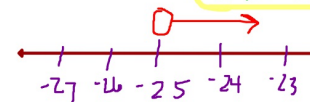
The following steps **DO** affect the direction of the inequality:

- Multiplying both sides by the same **negative** number
- Dividing both sides by the same **negative** number

Solve each inequality and graph the solution

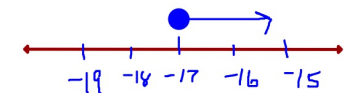
1. $4x + 15 - x > -60$

$$\begin{array}{r} 3x + 15 > -60 \\ -15 \quad -15 \\ \hline 3x > -75 \\ \hline x > -25 \end{array}$$



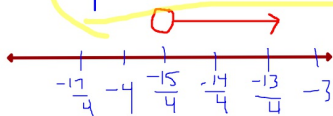
2. $8 - 2(x + 5) \leq 32$

$$\begin{array}{r} 8 - 2x - 10 \leq 32 \\ -2x - 2 \leq 32 \\ +2 \quad +2 \\ \hline -2x \leq 34 \\ \hline x \geq -17 \end{array}$$



3. $-9x - 8 + 6x < x + 7$

$$\begin{array}{r} -3x - 8 < x + 7 \\ +3x \quad +3x \\ \hline -8 < 4x + 7 \\ -7 \quad -7 \\ \hline -15 < 4x \\ \hline -15/4 < x \text{ or } x > -15/4 \end{array}$$



4. $11 - \frac{x}{2} + 3 > -4$

$$\begin{array}{r} 14 - \frac{x}{2} > -4 \\ -14 \quad -14 \\ \hline -2 \cdot -\frac{x}{2} > -18 \cdot -2 \\ \hline x < 36 \end{array}$$



You can now finish Hwk #17 - - Due Friday