

Bellwork: Algebra 1

1. Write down your homework for the night in your planner.
2. Grab your Algebra Nation book.
3. Solve the following inequality, graph it, and write it in interval notation.

$$4(2x - 10) \leq 2(x + 2) - 6$$

$$8x - 40 \leq 2x + 4 - 6$$

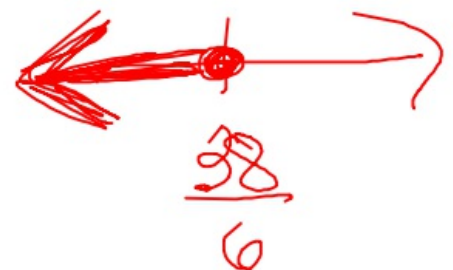
$$8x - 40 \leq 2x - 2$$

$$\begin{array}{r} -2x \quad -2x \\ \hline 6x - 40 \leq -2 \end{array}$$

$$\begin{array}{r} +40 \quad +40 \\ \hline 6x \leq 38 \end{array}$$

$$\frac{6x}{6} \leq \frac{38}{6}$$
$$x \leq \frac{38}{6}$$

$$\left(-\infty, \frac{38}{6}\right]$$



Section 2 – Topic 7
Solving Compound Inequalities

Consider the following options.

Option A: You get to play *NBA 2K* after you clean your room and do the dishes.

Option B: You get to play *NBA 2K* after you clean your room or do the dishes.

What is the difference between Option A and B?

Option a you would have to do both.

Circle the statements that are true.

$2 + 9 = 11$ and $10 < 5 + 6$

$4 + 5 \neq 9$ and $2 + 3 > 0$

$0 > 4 - 6$ or $3 + 2 = 6$

$15 - 20 > 0$ or $2.5 + 3.5 = 7$

These are called **compound equations** or **inequalities**.

- When the two statements in the previous sentences were joined by the word **AND**, the compound equation or inequality is true only if both statements are true.
- When the two statements in the previous sentences were joined by the word **OR**, the compound equation or inequality is true if at least one of the statements is true. Therefore, it is also considered true if both statements are true.

Let's graph $x < 6$ and $x > 1$.



This is the graphic representation to the compound inequality.

How many solutions does this inequality have?

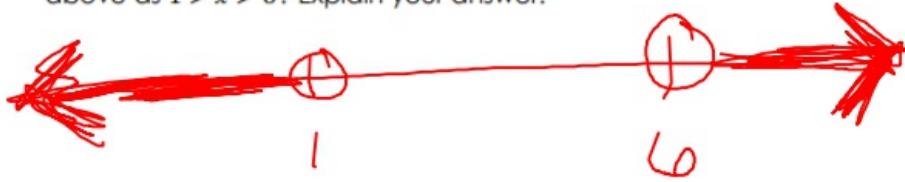
infinite

Many times this is written as $1 < x < 6$. This notation denotes the conjunction "and."

We read this as "x is greater than one and less than six."

Let's Practice!

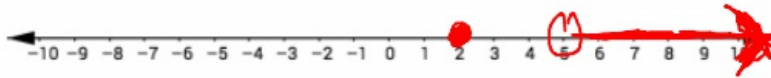
1. Consider $x < 1$ or $x > 6$. Could we write the inequalities above as $1 > x > 6$? Explain your answer.



~~$1 > x > 6$~~

2. Graph the solution set to each compound inequality on a number line.

a. $x = 2$ or $x > 5$



b. $x > 6$ or $x < 6$



c. $1 \leq -x \leq 7$



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

$$\underline{\underline{-1 \geq x}}$$

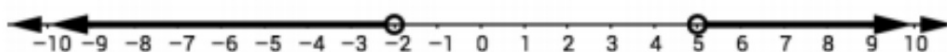
$$\frac{-x \leq 7}{-1} \quad \frac{1 \leq -x}{-1}$$

$$\underline{\underline{x \geq -7}}$$

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

$$\underline{\underline{-1 \geq x \geq -7}}$$

3. Write a compound inequality for the following graphs.



a. Compound inequality:

$$x < -2 \text{ or } x > 5$$



b. Compound inequality:

$$-2 \leq x < 5$$

$$x \geq -2$$

1

Try It!

4. Graph the solution set to each compound inequality on a number line.

a. $x < 1$ or $x > 8$



b. $x \geq 6$ or $x < 4$



c. $-6 \leq x \leq 4$



5. Write a compound inequality for the following graphs.



a. Compound inequality:

$$x \leq 0 \text{ or } x > 5$$



b. Compound inequality:

$$0 \leq x \leq 5$$

$$-2 \leq 3x + 7 < 10$$

$$\begin{array}{ccc} -7 & -7 & -7 \\ \hline \end{array}$$

$$\begin{array}{ccc} -9 & \leq & 3x < & 3 \\ \hline 3 & & 3 & & 3 \end{array}$$

$$-3 \leq x < 1$$

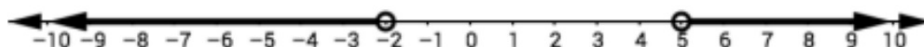


$$[-3, 1)$$

BEAT THE TEST!

1. Use the terms and symbols in the table to write a compound inequality for each of the following graphs. You may only use each term once, but you do not have to use all of them.

$3x$	-14	-6	\geq	$-$	17	15	$<$
$7x$	$<$	2	or	\leq	$3x$	$+$	$>$



Compound Inequality:



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