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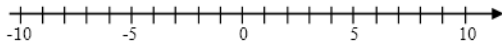
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UNIT 3 LESSON 4: MORE WORK WITH COMPOUND INEQUALITIES – HAVE NO FEAR!

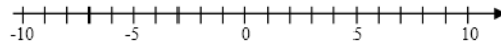
Compound inequalities are used in mathematics for a variety of purposes. It's good to get more practice in them, especially when it comes to visualizing what values of x lie in their solution sets.

You Try! Graph each of the following compound inequalities on the number lines provided.

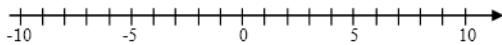
(a) $x < 1$ or $x \geq 4$



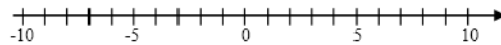
(b) $x > 7$ or $x < -2$



(c) $x > -3$ and $x < 5$



(d) $x \leq 9$ and $x \geq 0$



Inequalities involving AND are almost always universally written as a single inequality because these tend to show us how all values of x are between two numbers.

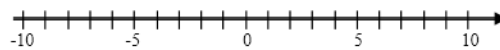
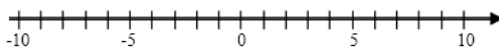
Exercise #1: Graph each of the following. First, rewrite as two inequalities involving the AND connector. Remember! When we are separating compound inequalities, it helps to start reading from x .

(a) $-4 \leq x < 6$

(b) $-5 \leq x \leq 9$

Two Inequalities: _____

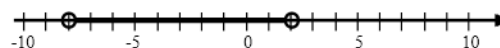
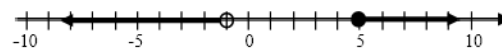
Two Inequalities: _____



Exercise #2: For each of the following graphs, write a compound inequality that describes all of the numbers shown graphed.

(a) Compound Inequality: _____

(b) Compound Inequality: _____



We now can put together our skills at solving inequalities with compound inequalities to write very sophisticated solution sets.

Exercise #3: Consider the compound inequality given by:

$$6x + 1 \geq 4 \text{ and } -2x + 8 > -12$$

All statements must be true

(a) Determine whether each of the following values of x falls in the solution set to this compound inequality. Show the work that leads to each answer.

$x = 5$

$$6x + 1 \geq 4 \quad -2x + 8 > -12$$

Overall, $6(5) + 1 \geq 4 \quad -2(5) + 8 > -12$
 we have $30 + 1 \geq 4 \quad -10 + 8 > -12$
 a TRUE statement. $31 \geq 4 \quad -2 > -12$
 TRUE TRUE

False

$x = -3$

$$6x + 1 \geq 4$$

$$6(-3) + 1 \geq 4$$

$$-18 + 1 \geq 4$$

$$-17 \geq 4$$

$$-2x + 8 > -12$$

$$2(-3) + 8 > -12$$

$$6 + 8 > -12$$

$$14 > -12$$

True

False

(b) Solve the compound inequality and graph its solution on the number line shown below.

Solve: $6x + 1 \geq 4$

$$\underline{6x} \geq \underline{3}$$

$$\cancel{6}x \geq \frac{3}{\cancel{6}}$$

$$x \geq \frac{3}{6}$$

$$x \geq \frac{1}{2}$$

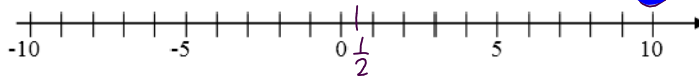
$$-2x + 8 > -12$$

$$\underline{-2x} > \underline{-20}$$

$$\cancel{-2}x > \frac{-20}{\cancel{-2}}$$

$$x < 10$$

Because -17 is not greater than or equal to 4



One more! Consider the compound inequality shown below:

$$\frac{1}{2}(x+4) < 5 \text{ or } -2(x-4) \leq 14$$

If one statement is true, the "OR" statement is true

(a) Show that each of the following values of x solve the compound inequality.

$x=0$

$$\frac{1}{2}(x+4) < 5 \quad -2(x-4) \leq 14$$

$$\frac{1}{2}(0+4) < 5 \quad -2(0-4) \leq 14$$

$$\frac{1}{2}(4) < 5 \quad -2(-4) \leq 14$$

$$2 < 5 \quad 8 \leq 14$$

TRUE TRUE

$x=8$

$$\frac{1}{2}(x+4) < 5 \quad -2(x-4) \leq 14$$

$$\frac{1}{2}(8+4) < 5 \quad -2(8-4) \leq 14$$

$$\frac{1}{2}(12) < 5 \quad -2(4) \leq 14$$

$$6 < 5 \quad -8 \leq 14$$

~~6 < 5~~ TRUE

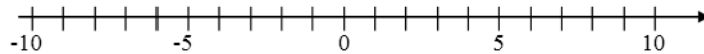


(b) Solve this compound inequality, graph the solution on the number line. What can you say about the solution set of this inequality?

HW

TRUE

TRUE

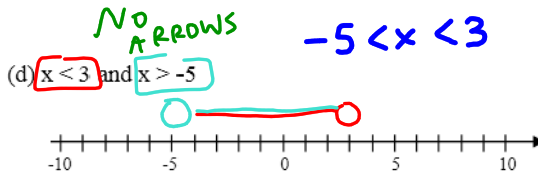
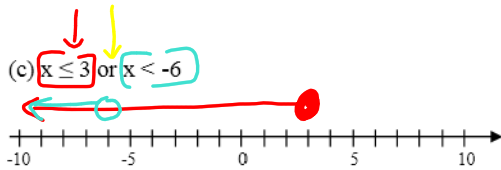
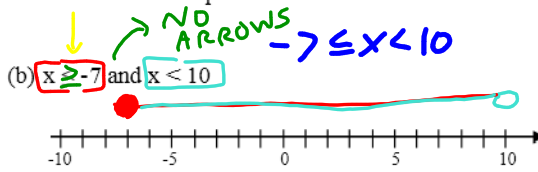
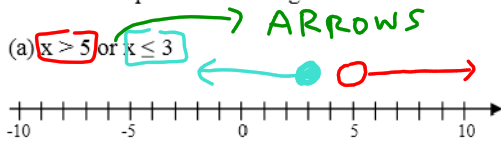


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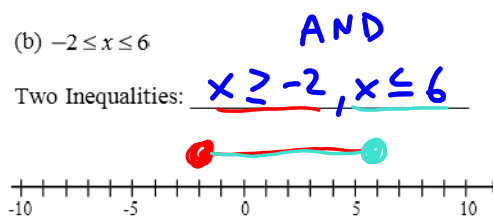
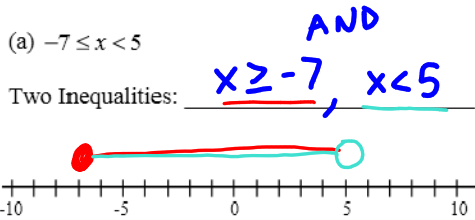
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PRACTICE! HOMEWORK! LET'S GET TO IT.

1. Graph each of the following compound inequalities on the number lines provided. If it's an AND statement write the inequalities as a single statement.



2. Graph each of the following. First, rewrite as two inequalities involving the AND connector.



3. For each of the following graphs, write a compound inequality that describes all of the numbers shown on the graph.

(a) Compound Inequality: _____

(b) Compound Inequality: _____

