Essential Questions: What are compound Inequalities? How do we determine the solution set to a compound inequality?

Do Now: Determine whether each compound statement below is true or false.

a) Right now, I am in math class **and** English class. T F False

b) Right now, I am in math class **and** sitting. T T True

c) $5 > 1$ **and** $5 < 7$ T T True

d) $5 < 1$ **and** $5 < 7$ F T False

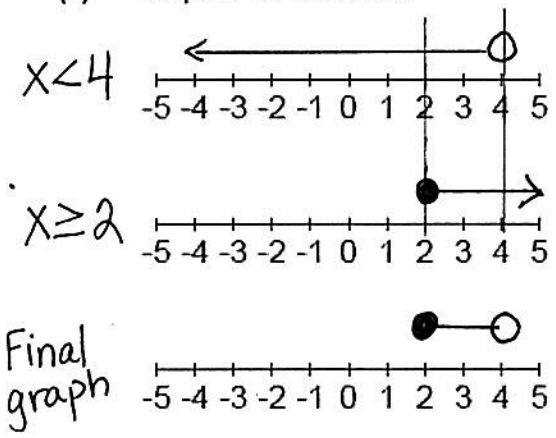
Think about this?
For any statements above that were determined to be true, what had to be true to make the statement true?

A compound inequality is two or more inequalities connected by the word AND **or by the word** OR.

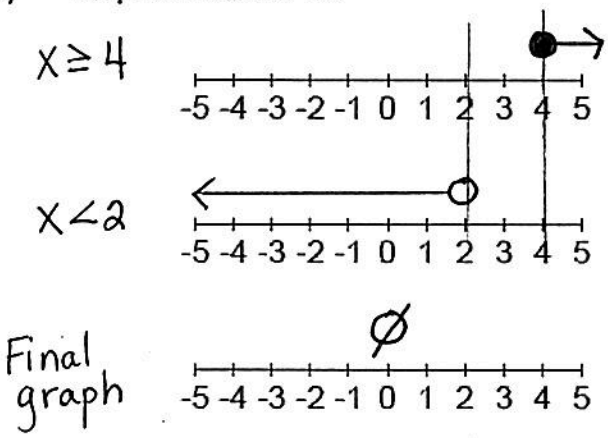
A number is a solution to a compound inequality connected by the word "AND" if the number is a solution to both inequalities.

Let's look at some examples....

(1) **Graph $x < 4$ and $x \geq 2$**



(2) **Graph $x \geq 4$ and $x < 2$**



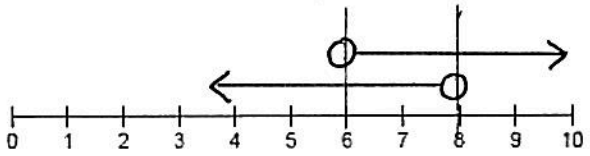
If it says "**AND**" only include the numbers where the inequalities OVERLAP but if it says "**AND**" and the inequalities DO NOT overlap, then there is NO SOLUTION, or ∅. { } empty set

(3) Graph the solution set of the compound inequality.

$6 < x < 8$

$x > 6$ and $x < 8$

scrap



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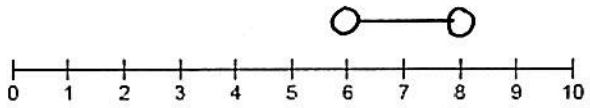

Represent the solution set in interval notation.

$(6, 8)$

(4) Solve the compound inequality and graph the solution set.

$6x - 4 < 26$ and $x + 2 \geq 1$

$\frac{6x}{6} < \frac{30}{6}$ $-2 \quad -2$

$x < 5$ and $x \geq -1$

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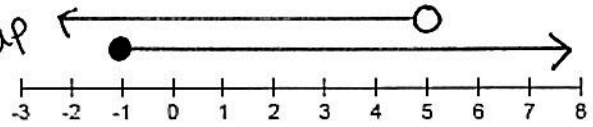

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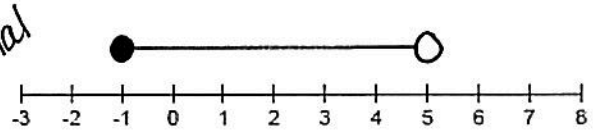
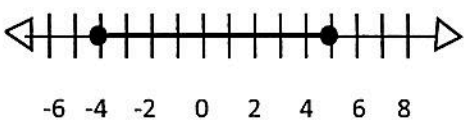


$-1 \leq x < 5$

Represent the solution set in set builder and interval notation.

$[-1, 5)$

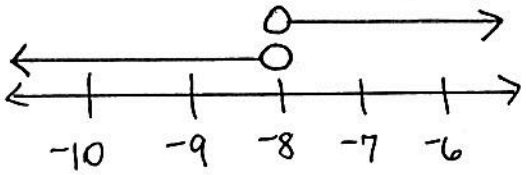
(5) Describe the solution set shown below in <u>two</u> different ways.



$-4 \leq x \leq 5$

$[-4, 5]$

(6) Describe the solution set of the following compound inequality: $-8 < x < -8$



$x > -8$ and $x < -8$

No solution

(7) A poll shows that a candidate is projected to receive 57% of the votes. If the margin for error is plus or minus 3%, write a compound inequality for the percentage of votes the candidate can expect to get.

Let x = the percentage of votes

$57 - 3 \qquad 57 + 3$

$54 \leq x \leq 60$

The TAKE AWAY

A solution to a compound inequality separated by the word "AND" is only a solution if it satisfies both inequalities.