KEY

AA – Section 3.1 – Inequalities and Their Graphs

Objective: To write, graph, and identify solution of inequalities.

Less than $<$	Less than or equal to $\leq$
Greater than $>$	Greater than or equal to $\geq$

Writing Inequalities – Write an inequality to represent the verbal expression.

1. all real numbers x greater than or equal to 1.5 $x \geq 1.5$
2. The sum of x and 7 is less than – 3. $x + 7 < -3$
3. 5 less than a number x is greater than or equal to 13 $x - 5 \geq 13$
4. all real numbers less than 10 $x < 10$

Vocabulary: A solution of an inequality is any number than makes the inequality true.

Identifying Solutions by Evaluating – Substitute the value in for x. Does it make the inequality true?

Is the number a solution to $3x + 4 > 10$?

a. 0 NO
$3(0)+4>10$
$0+4>10$
$4>10$

b. 3 YES
$3(3)+4>10$
$9+4>10$
$13>10$

5. Which numbers are solutions of $13 - 7y \leq 6$?

a. – 1 NO
$13-7(-1)\leq 6$
$13+7\leq 6$
$20\leq 6$

b. 0 NO
$13-7(0)\leq 6$
$13-0\leq 6$
$13\leq 6$

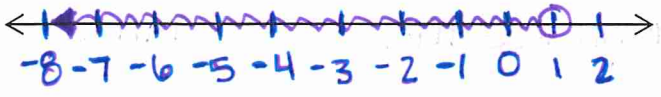
c. 1 YES
$13-7(1)\leq 6$
$13-7\leq 6$
$6\leq 6$

d. 3 YES
$13-7(3)\leq 6$
$13-21\leq 6$
$-8\leq 6$

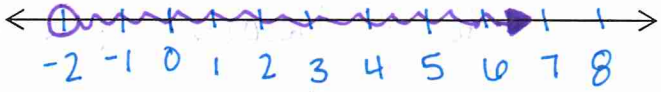
Graphing Inequalities – *when graphing, you must show me where zero is and count out to your number*

$>$ or $<$	open circle (does not include this exact value as a solution)
$\geq$ or $\leq$	closed circle (does include this exact value as a solution)

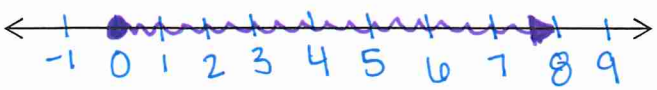
6. $x < 1$



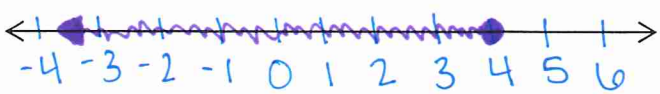
7. $x > -2$



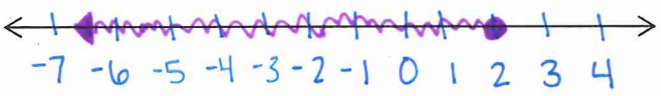
8. $x \geq 0$



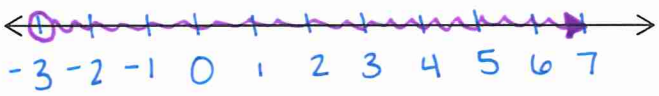
9. $x \leq 4$



10. $2 \geq x$ $x \leq 2$

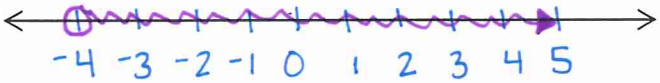


11. $-3 < x$ $x > -3$

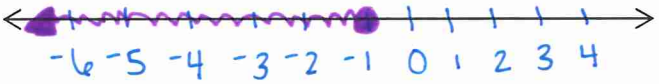


You try:

12. $x > -4$

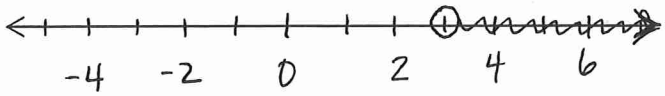


13. $-1 \geq x$ $x \leq -1$



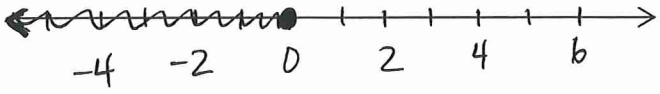
Write an inequality that represents the graph.

14.



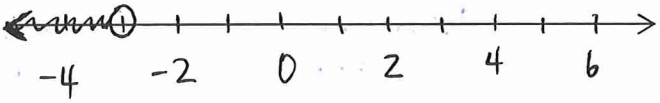
$x > 3$

15.



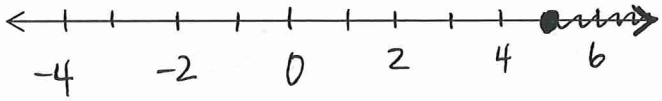
$x \leq 0$

16.



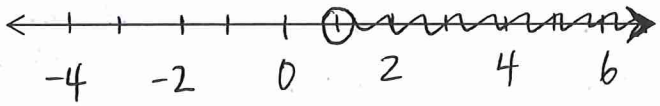
$x < -3$

17.



$x \geq 5$

18.



$x > 1$

In words, how do you describe the graph on #18?

All real numbers greater than 1.

A speed limit sign says 45 mph. The sign indicates $x \leq 45$, where x represents a legal speed in miles per hour. Can the speed be all real numbers less than or equal to 45? Explain.

No, the speed cannot be all real numbers less than or equal to 45 because you cannot go less than zero miles per hour.