

1-8-19

Aim: SWBAT represent inequalities on a number line and in interval notation.

HW: Packet Page 5

Do Now: Put your name on the new packet

AIM: SWBAT represent inequalities on a number line and in interval notation.

Inequality Symbols: $<$, $>$, \leq , \geq

$<$ means is less than

\leq means is less than or equal to

$>$ means is greater than

\geq means is greater than or equal to

Understanding Inequalities:

In an inequality, the variable represents more than one solution; in fact, it represents an infinite number of solutions. Therefore, if we want to show the solution to an inequality, we must graph it on a number line.

Write a verbal phrase to describe the inequality

1) $f \geq -4$ "All real #s greater than or equal to -4."

2) $d < 9$ "All real #s less than 9."

3) $w > -19$ "All real #s greater than -19."

4) $g \leq 0$ "All real #s less than or equal to 0."

When graphing inequalities you have to decide what type of circle to use:

"OPEN CIRCLE" Not Equal To

"CLOSED CIRCLE" Equal To

State whether you would use a closed or open circle (circle your answer) Explain.

1) $x < 8$ closed open because 8 is not part of the solution set

2) $x \geq -8$ closed open because -8 is part of the solution set

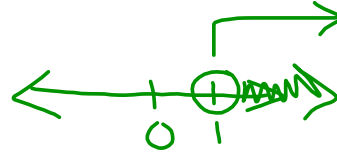
3) $x \leq -8$ closed open because -8 is part of the solution set

4) $x > 8$ closed open because 8 is not part of the solution set

To graph an inequality on a number line you should:

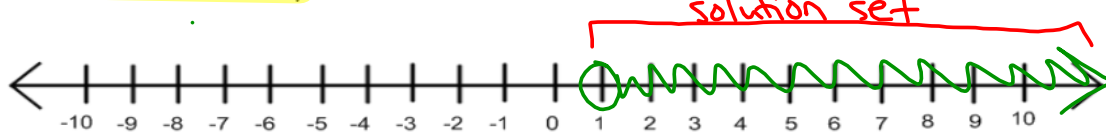
- Mark the number with either an open ($<$, $>$) or closed (\leq , \geq) circle.
- Shade the number line to represent the solutions.

Graph of the inequality, $x > 1$, on the number line:



Use the number line below:

- Mark an open circle on the number 1.
- Shade to the right of the number 1 including the arrow. **Shading the arrow** indicates that the numbers continue infinitely. The shaded arrow indicates that there is **no UPPER boundary** because the set of real numbers is INFINITE.



CHECK your graph.

Choose a number in the shaded area: 6

Replace the variable with that number: 6 $>$ 1. Is this TRUE?

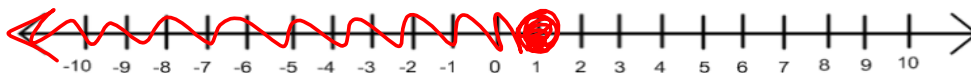
(If so, your shading is correct. If it is false you should have shaded in the other direction.)

Interval notation is another way to represent an inequality. When written in interval notation inequality, $x > 1$, would be represented as $(1, \infty)$. The number, 1 represents the boundary. The symbol ∞ , represents INFINITY and indicates that there is no UPPER boundary. The parenthesis es indicate that the boundary values are NOT included.

Graph the inequality $x \leq 1$ on the number line:

Use the number line below:

- Mark a closed circle on the number 1.
- Shade to the left of the number 1 including the arrow.
- Remember to **Check!!**



When written in interval notation inequality, $x \leq 1$, would be represented as $(-\infty, 1]$.

The symbol $-\infty$, represents **NEGATIVE INFINITY** and indicates that there is no **LOWER** boundary. The **BRACKET** indicate that the boundary values **ARE** included.

Summary:

Use [or] for when you would use a **CLOSED CIRCLE**.

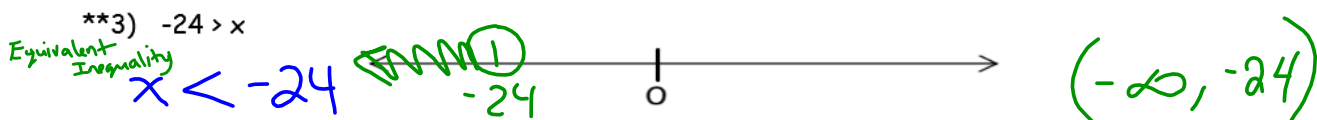
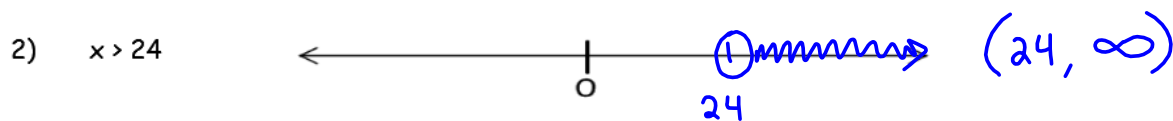
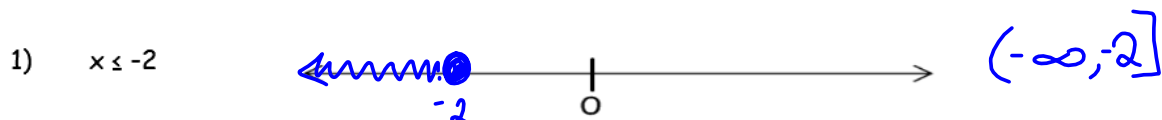
Use (or) when you would use an **OPEN CIRCLE** or to represent $-\infty$ or ∞ .

You Try! Tell whether the number given is a solution to the inequality graphed below.

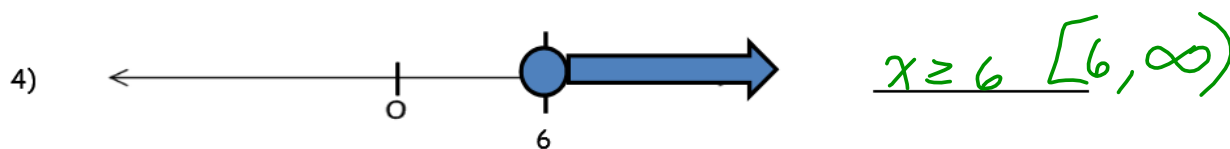


- 1) -6.5 No 2) 0 Yes 3) $-3\frac{1}{2}$ Yes 4) 4 Yes
 5) -5 No 6) -5.5 No 7) -4.9 Yes 8) -5.1 No
 9) Write the inequality that is represented by the number line above: $x > -5$.
 10) Use interval notation to represent the inequality graphed above: $(-5, \infty)$.

Graph each inequality. ** Make sure the variable is first before you graph!
 Then use interval notation to represent the inequality.



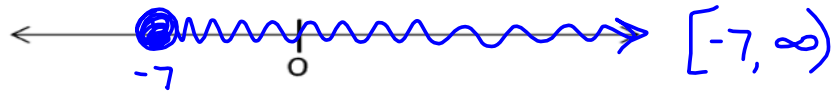
Write an inequality for each graph, then represent it in interval notation.



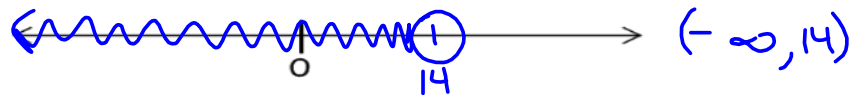
You Try!

Graph each inequality then represent it using interval notation.

1) $x \geq -7$

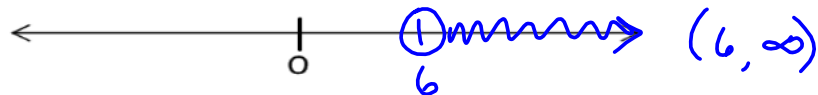


2) $x < 14$



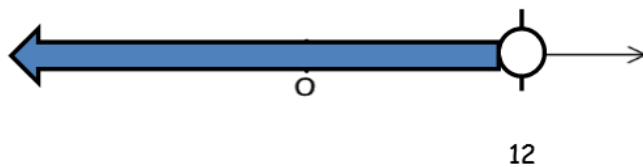
**3) $6 < x$

$x > 6$



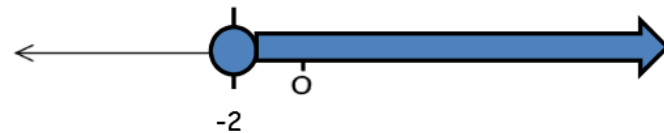
Write an inequality for each graph, then represent the inequality in interval notation.

4)



$x < 12$ $(-\infty, 12)$

5)



$x \geq -2$ $[-2, \infty)$

Homework

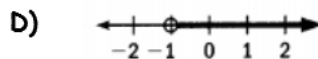
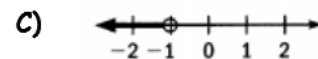
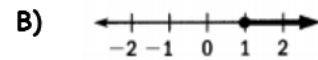
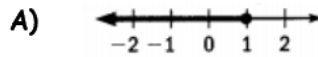
Match the inequality with its graph:

1) $x < -1$

2) $x \leq 1$

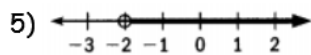
3) $x \geq 1$

4) $x > -1$



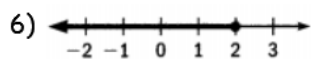
Write the inequality and the verbal phrase represent by each graph.

Represent each inequality in interval notation.



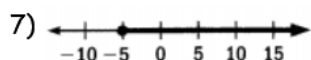
Inequality: _____ Interval Notation: _____

Verbal Phrase: _____



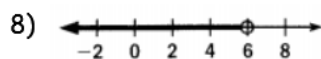
Inequality: _____ Interval Notation: _____

Verbal Phrase: _____



Inequality: _____ Interval Notation: _____

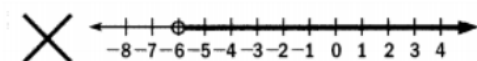
Verbal Phrase: _____



Inequality: _____ Interval Notation: _____

Verbal Phrase: _____

9) Describe and correct the error in graphing $x \geq -6$.



10) Are the inequalities $x < 12$ and $12 > x$ equivalent? Explain.

11) The frequency, f , of the human singing voice is at least 81 hertz and not more than 1100 hertz. Which statement is NOT true about f ?

A) $f \geq 81$

B) $f \leq 1100$

C) $81 \leq f$

D) $f \geq 1100$