

UNIT 2 - DAY 13

INEQUALITIES AND INTERVAL NOTATION



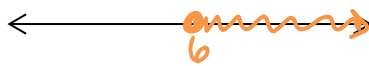
Warm It Up!

Solve and graph the following inequalities:

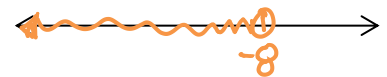
1. $x - 8 \leq -4$
 $\quad +8 \quad +8$
 $\quad \underline{\hspace{2cm}}$
 $x \leq 4$



2. $6x - 7 \geq 2x + 17$
 $\quad -2x \quad -2x$
 $\quad \underline{\hspace{2cm}}$
 $4x - 7 \geq 17$
 $4x \geq 24$
 $x \geq 6$



3. $\frac{x}{4} < -2 \cdot 4$
 $x < -8$

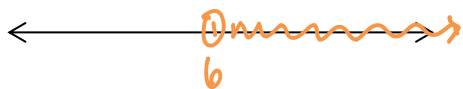


Interval Notation: We can represent these inequalities - as intervals - in a different way...

- Parentheses () represent: Less than / greater than - open circle
- Brackets [] represent: Less than / or = to - closed circle
greater than
- The smallest number is always on the left, while the biggest number is on the right (separated by a comma).
- Infinity symbols are always enclosed with parentheses.

*First graph!

$x > 6$ can be represented as $(6, \infty)$



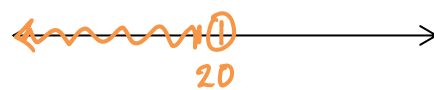
$x \geq 12$ can be represented as $[12, \infty)$



$x \leq 4$ can be represented as $(-\infty, 4]$

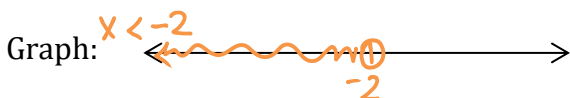


$x < 20$ can be represented as $(-\infty, 20)$



Solve and graph the following, write your answers in two ways:

1. $3(x + 4) < 6$
 $3x + 12 < 6$
 $3x < -6$



Inequality: $x < -2$

Interval: $(-\infty, -2)$

2. $-2x - 7 \geq 17$
 $\quad +7 \quad +7$
 $\quad \underline{\hspace{2cm}}$
 $-2x \geq 24$
 $\quad -2 \quad -2$
 $x \leq -12$



Inequality: $x \leq -12$

Interval: $(-\infty, -12]$

Numbers Game Every time you see a stop sign, come check your work to play the game!

1. $5x - 9 > 6$

$\frac{+9 \quad +9}{5x > 15}$

$5x > 15$

$x > 3$



Inequality: $x > 3$

Interval: $(3, \infty)$

2. $2(x + 3) > -4 + x$

$2x + 6 > -4 + x$

$x + 6 > -4$

$x > -10$

$-10 < x$ or $x > -10$



Inequality: $x > -10$

Interval: $(-10, \infty)$

3. $5 - (x - 2) \geq 2x + 1$

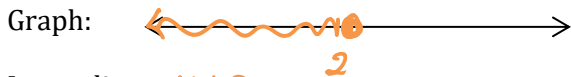
$\frac{5 - x + 2}{7 - x} \geq 2x + 1$

$\frac{+x \quad +x}{7 \geq 3x + 1}$

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

$2 \geq x$

or
 $x \leq 2$



Inequality: $x \leq 2$

Interval: $(-\infty, 2]$

4. $-x + 3 \leq -15$

$\frac{-3 \quad -3}{-x \leq -18}$

$\frac{-1 \quad -1}{x \geq 18}$

$x \geq 18$



Inequality: $x \geq 18$

Interval: $[18, \infty)$

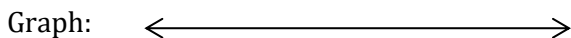
Special Cases... See if you and your partner can do these on your own!

5. $9y - 3 > 3(3y + 2)$

$9y - 3 > 9y + 6$

$-3 > 6$ False!

NO SOLUTION



Inequality: /

Interval: /

6. $18x + 9 \leq 9(2x + 1)$

$18x + 9 \leq 18x + 9$

$9 \leq 9$ True!

\mathbb{R}



Inequality: \mathbb{R}

Interval: $(-\infty, \infty)$