Solve the following inequality. Graph the solution set and write in interval notation.

$$-2(x+4) \leq 4x - 5 + 13$$

$-2x - 8 \leq 4x + 8$

$-4x \qquad -4x$

$-6x - 8 \leq 8$

$+8 \qquad +8$

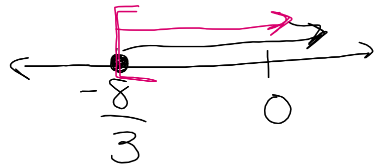
$-6x \leq 16$

$\frac{-6x}{-6} \quad \frac{16}{-6}$

$x \geq -\cancel{\frac{16}{6}} \quad -\frac{8}{3}$

$x \geq -\frac{8}{3}$

[ ] ( )



$\left[-\frac{8}{3}, \infty\right)$

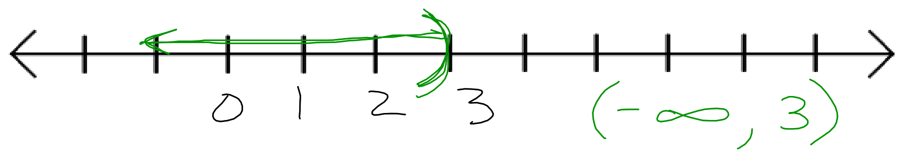
Set Notation	Graph	Interval Notation
{x | x < a}	a	(-∞, a)
{x | x > a}	a	(a, ∞)
{x | x ≤ a}	a	(-∞, a]
{x | x ≥ a}	a	[a, ∞)
{x | a < x < b}	a b	(1, 3) (a, b)
{x | a ≤ x ≤ b}	a b	[a, b]
{x | a < x ≤ b}	a b	(a, b]

p. 77

With interval notation, open and closed circles on a number line become ( ) and [ ] to show if an inequality is open or closed.

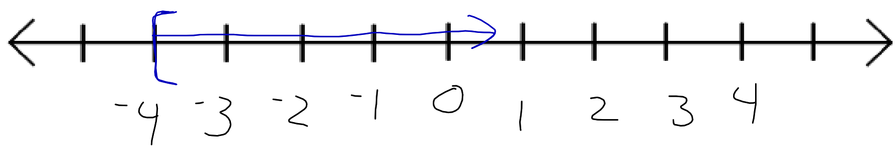
$\boxed{< \; >}$ $\boxed{\circ}$ $\boxed{\le \; \ge}$ $\boxed{\bullet}$

Graph {x|x < 3} using interval notation symbols.



$(-\infty, 3)$

Graph {y|y ≥ -4} using interval notation symbols.



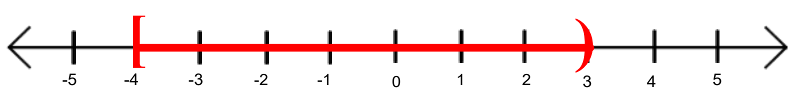
$[-4, \infty)$

Write the set and interval notation for the following number lines:

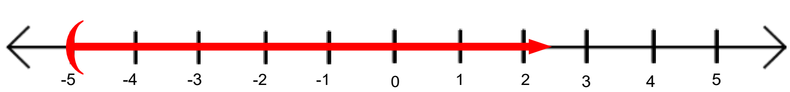
$-4 \le x < 3$

$\{x \mid x \ge -4 \text{ and } x < 3\}$

Hint: Read the line left to write and fill in what you see. Arrow = ∞.

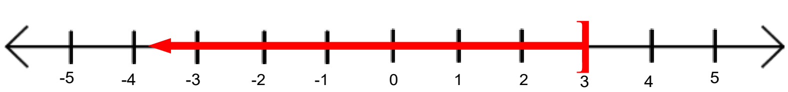


$[-4, 3)$



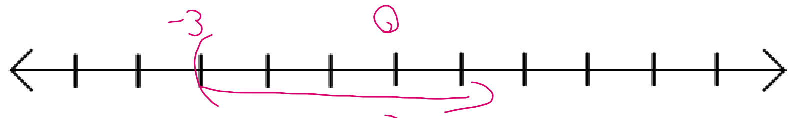
$\{x \mid x > -5\}$ $(-5, \infty)$

3)



$\{x \mid x \le 3\}$ $(-\infty, 3]$

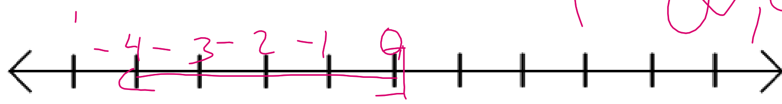
a. $\{x \mid x > -3\}$



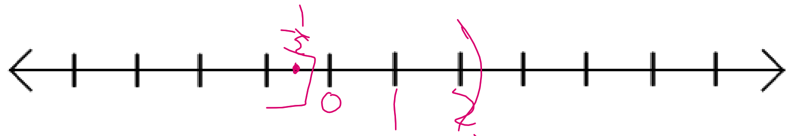
$(-3, \infty)$

b. $\{x \mid x \le 0\}$

$(-\infty, 0]$



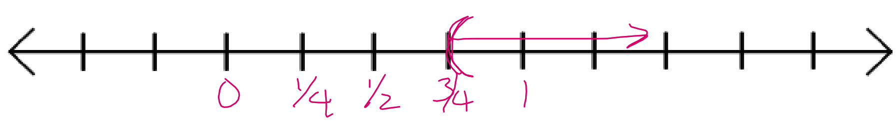
c. $\{x \mid -1/2 \le x < 2\}$



$[-\frac{1}{2}, 2)$

What do you do if the variable is on the right side instead of the left? Solve, rewrite and flip the inequality sign.

$^3/_4 < a$ $\quad a > 3/4 \quad (\frac{3}{4}, \infty)$



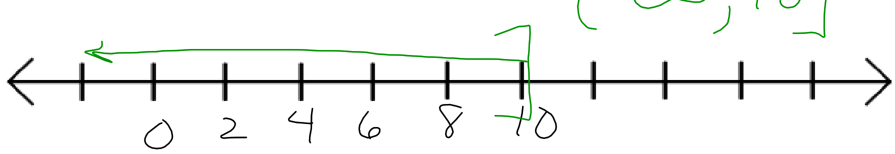
$5(-1 + 3) \ge m$

$5 \cdot 2 \ge m$

$10 \ge m$

$m \le 10$

$(-\infty, 10]$



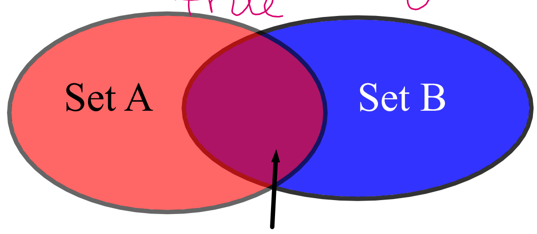
Compound Inequalities:

Two inequalities joined by the words **and** or **or**.

The **solution set** of an **and** inequality is the **intersection** of two sets.

The solution set is values that work for both inequalities.

makes both inequalities true



A∩B

- "and"
- note: ∩ represents
- "intersection"
- common to both

Compound Inequality

Use the following sets:

A = {1, 2, 3, 4, 5}

B = { 3, 4, 5, 6}

C = {x | x is an odd number greater than 0 and less than 9}

D = {x | x is an a whole number less than 5}

a) A ∩ B

{3, 4, 5}

b) B ∩ D

{3, 4}

c) C ∩ D

{1, 3}

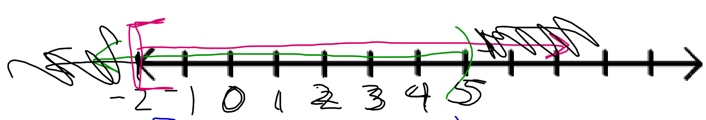
A value is a solution of a compound inequalities formed by "and" if it is a solution of both inequalities.

Example:

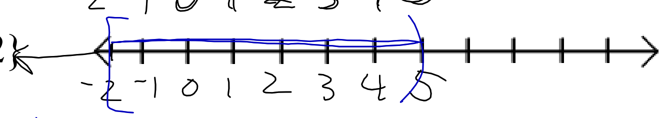
$x < 5$ and $x \geq -2$

$\{x \mid x < 5\}$

$\{x \mid x \geq -2\}$



$\{x \mid x < 5 \text{ and } x \geq -2\}$



[-2, 5)

Solve the inequalities.
Graph each solution set and write in interval notation:

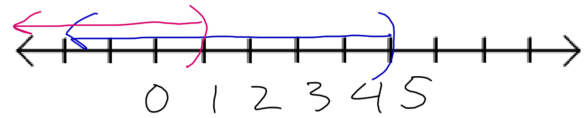
$x + 5 < 9$ and $3x - 1 < 2$

$x < 4$

$+1 \quad +1$

$\frac{3x}{3} < \frac{3}{3}$

$x < 1$



$(-\infty, 1)$

$x + 8 > 12$ and $2x < 14$

$-8 \quad -8$

$\frac{2x}{2} < \frac{14}{2}$

$x > 4$

$x < 7$

$(4, 7)$