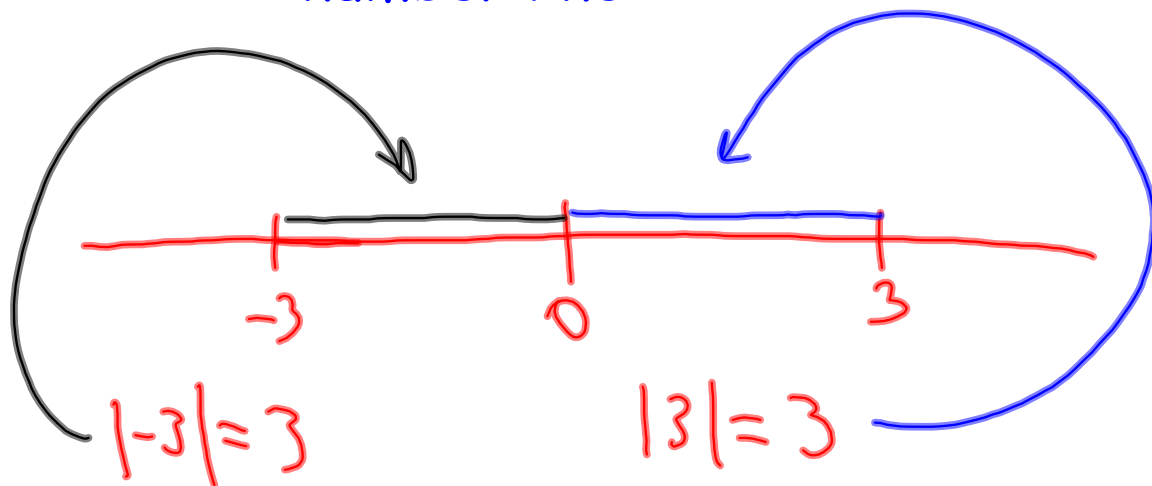


# Absolute value

$|x|$  — Positive distance from zero on a number line



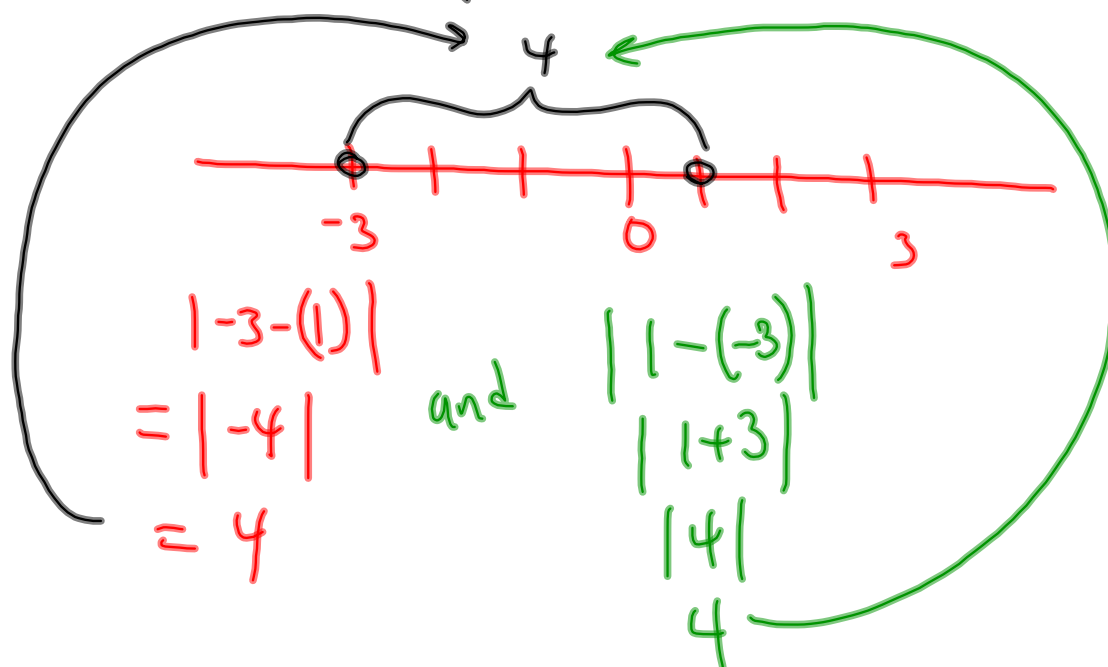
$$|x| < y$$

can  $x$  be  $(-)$  ?

$$|x+3| = 2$$

can  $x$  be  $(-)$  ?

$|a-b|$  = positive distance between  
a and b on number line



Solving equations w/ abs values

$$|x+2| = 1$$

consider 2 cases

if  $x+2 > 0$

$$|x+2| = 1$$

$$x+2 = 1$$

$$x = -1$$

if  $x+2 < 0$

$$|x+2| = 1$$

$$-(x+2) = 1$$

$$-x - 2 = 1$$

$$-x = 3$$

$$x = -3$$

$$|x+2|=1$$

$$\begin{aligned}x+2 &= 1 \\ x &= -1\end{aligned}$$

$$\begin{aligned}x+2 &= -1 \\ x &= -3\end{aligned}$$



if  $4x^2 - 6x + 1 < 0$  and  $4x^2 + |4x^2 - 6x + 1| = 3$  what is the value of  $x$ ?

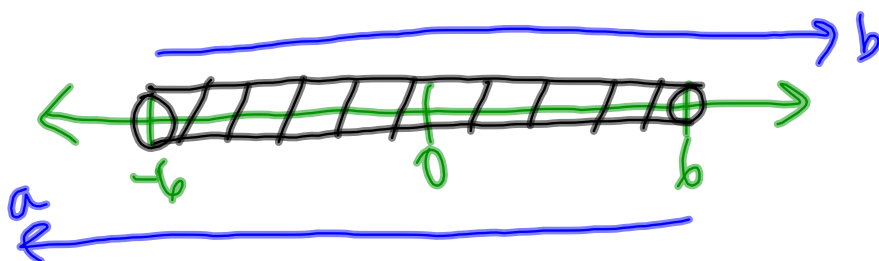
$$\begin{aligned}4x^2 - (4x^2 - 6x + 1) &= 3 \\6x - 1 &= 3 \\6x &= 4 \\x &= \frac{2}{3}\end{aligned}$$

absolute values in inequalities

$$|x| < 6$$

$x$  is within 6 from zero on the number line

$x < 6$  (a)  
 $-x < 6$  (b)  
 $x > -6$   
both must be true!!





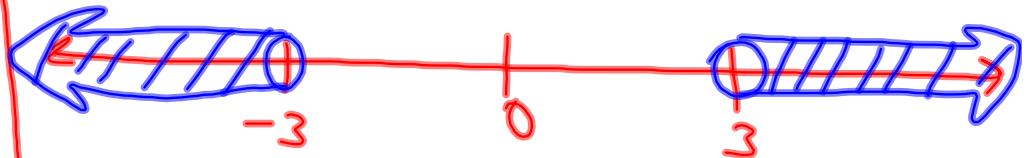
- A)  $|x| > 2$
- B)  $|x| \geq 2$
- C)  $|x| < 2$
- D)  $|x| \leq 2$
- F)  $|x| = 2$

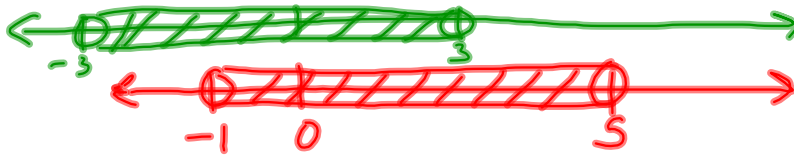


$$|x| > 3$$

$x$  must be more than 3 away from zero on number line

$$\begin{array}{l} x > 3 \text{ (a)} \\ -x > 3 \text{ (b)} \\ x < -3 \end{array}$$





- A)  $|x+2| < 3$   
 B)  $|x-2| < 3$   
 C)  $|x-3| < 2$   
 D)  $|x+3| < 2$   
 E)  $|x| < 5$

$$f(x) \Rightarrow f(x-2)$$

$$|x| < 3$$

$$\Rightarrow |x-2| < 3$$



A)  $|x+2| < 3$

B)  $|x-2| < 3$

C)  $|x-3| < 2$

D)  $|x+3| < 2$

E)  $|x| < 5$

|    |   |       |
|----|---|-------|
| -1 | 5 |       |
| ✓  | x |       |
| B  | B | ←     |
| x  | B | - - - |
| B  | x |       |

$$\begin{array}{l}
 | + | \\
 x+2 < 3 \\
 \underline{x < 1} \\
 | - | \\
 x-2 < 3 \\
 \underline{x < 5} \\
 x < 5 \quad | \quad x = -1
 \end{array}$$

$$-x = |y + 2|$$
$$\begin{array}{l} -x = y + 2 \\ -x = -(y + 2) \end{array}$$
$$\begin{array}{l} \underline{-x = y + 2} \\ \underline{-x = -y - 2} \end{array}$$

$$y = 0 \quad x = -2$$