

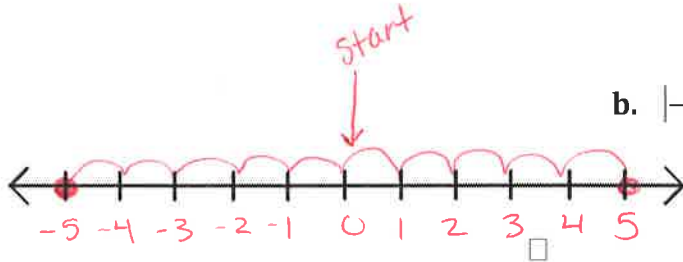
ABSOLUTE VALUE

- The absolute value of a number x , written $|x|$, is the distance the number is from 0 on a number line.

Example 1:

a. $|5| = 5$

b. $|-5| = 5$



ABSOLUTE VALUE EQUATIONS

Example 2: Solve a simple absolute value equation.

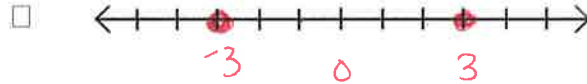
a. $|x| = 4$

$x = 4$ or $x = -4$



b. $|x| = 3$

$x = 3$ or $x = -3$



c. $|x| = -5$

Absolute value cannot be negative!

\emptyset NO SOLUTION

Example 3: Solve a simple absolute value equation.

a. $|x - 5| = 7$

$x - 5 = 7$ or $x - 5 = -7$
 $+5 \quad +5$

$x = 12$ or $x = -2$

b. $|2x - 9| = 15$

$2x - 9 = 15$ or $2x - 9 = -15$
 $+9 \quad +9$

$\frac{2x}{2} = \frac{24}{2}$ $\frac{2x}{2} = \frac{-6}{2}$

$x = 12$ or $x = -3$

c. $|-x + 3| = 7$

$-x + 3 = 7$ or $-x + 3 = -7$
 $-3 \quad -3$

$\frac{-x}{-1} = \frac{4}{-1}$ $\frac{-x}{-1} = \frac{-10}{-1}$

$x = -4$ or $x = 10$

d. $|-3x + 3| = 15$

$-3x + 3 = 15$ or $-3x + 3 = -15$
 $-3 \quad -3$

$\frac{-3x}{-3} = \frac{12}{-3}$ $\frac{-3x}{-3} = \frac{-18}{-3}$

$x = -4$ or $x = 6$

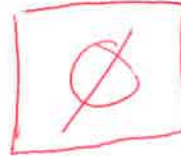
e. $|5 - 6x| = 13$

$$\begin{array}{r} 5 - 6x = 13 \quad \text{or} \quad 5 - 6x = -13 \\ \hline -5 \quad -5 \quad \quad \quad -5 \quad -5 \\ \hline -6x = 8 \quad \quad \quad -6x = -18 \\ \hline -6 \quad -6 \quad \quad \quad -6 \quad -6 \end{array}$$

$$x = -\frac{4}{3} \quad \text{or} \quad x = 3$$

f. $|-5 - 4x| = -11$

Negative!



Classwork

1. $|x| = 6$

$$x = 6 \quad \text{or} \quad x = -6$$

2. $|x + 3| = 8$

$$\begin{array}{r} x + 3 = 8 \quad \text{or} \quad x + 3 = -8 \\ \hline -3 \quad -3 \quad \quad \quad -3 \quad -3 \\ \hline x = 5 \quad \text{or} \quad x = -11 \end{array}$$

3. $|3x - 6| = 12$

$$\begin{array}{r} 3x - 6 = 12 \quad \text{or} \quad 3x - 6 = -12 \\ \hline +6 \quad +6 \quad \quad \quad +6 \quad +6 \\ \hline 3x = 18 \quad \quad \quad 3x = -6 \\ \hline 3 \quad 3 \quad \quad \quad 3 \quad 3 \\ \hline x = 6 \quad \text{or} \quad x = -2 \end{array}$$

4. $|4x + 2| = -10$



Negative!
Absolute value cannot = negative!

5. $|2x - 5| = 9$

$$\begin{array}{r} 2x - 5 = 9 \quad \quad \quad 2x - 5 = -9 \\ \hline +5 \quad +5 \quad \quad \quad +5 \quad +5 \\ \hline 2x = 14 \quad \quad \quad 2x = -4 \\ \hline 2 \quad 2 \quad \quad \quad 2 \quad 2 \\ \hline x = 7 \quad \text{or} \quad x = -2 \end{array}$$

6. $|x| = -3$

