

1. Define absolute value:

Solve the following absolute value equations and check your solutions.

* Isolate absolute value signs first

2. $|x - 4| = 7$

$$\begin{array}{l} \wedge \\ x - 4 = 7 \quad x - 4 = -7 \\ +4 \quad +4 \quad +4 \quad +4 \end{array}$$

$$\boxed{x = 11 \text{ and } x = -3}$$

3. $2|5 - x| - 7 = -3$

$$\frac{2|5 - x|}{2} = \frac{4}{2}$$

$$\begin{array}{l} |5 - x| = 2 \\ \wedge \\ \begin{array}{l} 5 - x = 2 \\ -5 \quad -5 \\ -x = -3 \\ -1 \quad -1 \end{array} \quad \begin{array}{l} 5 - x = -2 \\ -5 \quad -5 \\ -x = -7 \\ -1 \quad -1 \end{array} \end{array}$$

$$\boxed{x = 3 \text{ and } x = 7}$$

Solve the following absolute value inequality. Then graph your solution.

4. $|2x - 1| > 5$

"or"

$$\begin{array}{l} 2x - 1 > 5 \\ +1 \quad +1 \end{array} \quad \begin{array}{l} 2x - 1 < -5 \\ +1 \quad +1 \end{array}$$

$$\frac{2x}{2} > \frac{6}{2} \quad \frac{2x}{2} < \frac{-4}{2}$$

$$\boxed{x > 3 \text{ or } x < -2}$$

5. $|\frac{2}{3}x + 5| \leq 1$

$$\frac{2}{3}x + 5 \leq 1$$

$$\left(\frac{3}{2}\right) \frac{2}{3}x \leq -4 \left(\frac{3}{2}\right)$$

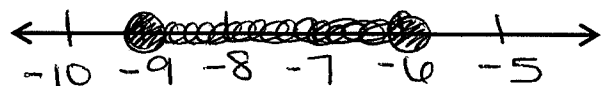
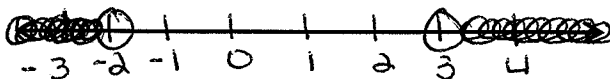
$$x \leq -6$$

$$\frac{2}{3}x + 5 \geq -1$$

$$\left(\frac{3}{2}\right) \frac{2}{3}x \geq -6 \left(\frac{3}{2}\right)$$

$$x \geq -9$$

$$\boxed{-9 \leq x \leq -6}$$



6. Evaluate the following function for $f(-4)$ and $f(3)$.

$$f(x) = 2|x + 1| - 5$$

$$f(-4) = 2|-4 + 1| - 5$$

$$= 2|-3| - 5$$

$$= 2(3) - 5$$

$$= 6 - 5$$

$$f(3) = 2|3 + 1| - 5$$

$$= 2|4| - 5$$

$$= 2(4) - 5$$

$$= 8 - 5$$

$$f(-4) = 1$$

$$f(3) = 3$$

7. $y = -|x - 3|$

Transformations:

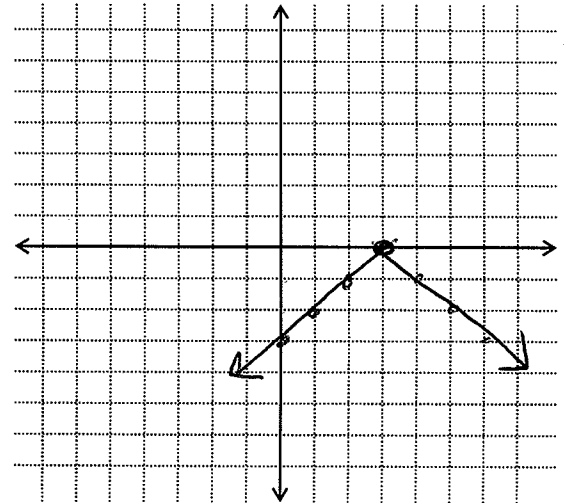
- right 3
- reflection over the x-axis

Vertex: $(3, 0)$

x-intercept(s): $(3, 0)$

y-intercept: $(0, -3)$

D: $(-\infty, \infty)$ R: $(-\infty, 0]$ ↙ bracket!



8. $y = 3|x + 2| - 1$

Transformations:

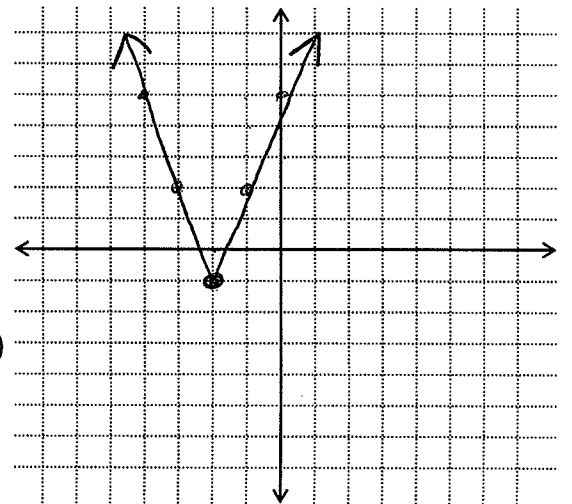
- left 2
- down 1
- vertical stretch

Vertex: $(-2, -1)$

x-intercept(s): $(-2.33, 0)$ and $(-1.67, 0)$ (*will need to solve for algebraically*)

y-intercept: $(0, 5)$

D: $(-\infty, \infty)$ R: $[-1, \infty)$



$$0 = 3|x + 2| - 1$$

$$+1 \quad \quad \quad +1$$

$$\frac{1}{3} = \frac{3|x + 2|}{3}$$

$$\frac{1}{3} = |x + 2|$$

$$\frac{1}{3} = x + 2$$

$$-2$$

$$x = -1.67$$

$$-\frac{1}{3} = x + 2$$

$$-2$$

$$x = -2.33$$