

Objective: To graph absolute value functions.

Warm Up:

1. Identify the vertex, direction of opening and the slopes of the rays in the given function:

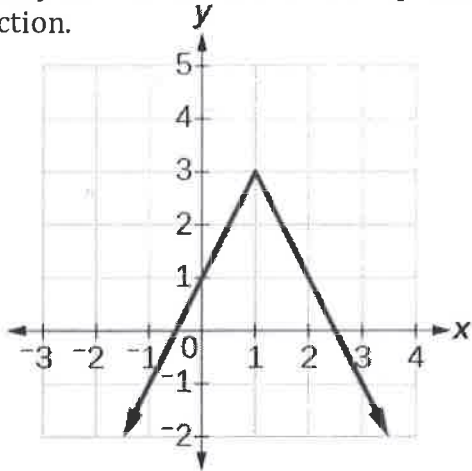
$$y = 3|x + 2| - 5$$

Vertex: $(-2, -5)$
 opens up

Slope: ± 3

Stretches by a factor of 3

2. Identify the vertex, direction of opening and the slopes of the rays in the given function and write the function.



Vertex: $(1, 3)$ Direction of Opening: down

Slopes of Rays: ± 2 Transformations: right 1, up 3,
 stretches by 2,
 reflects over x-axis

Equation:

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

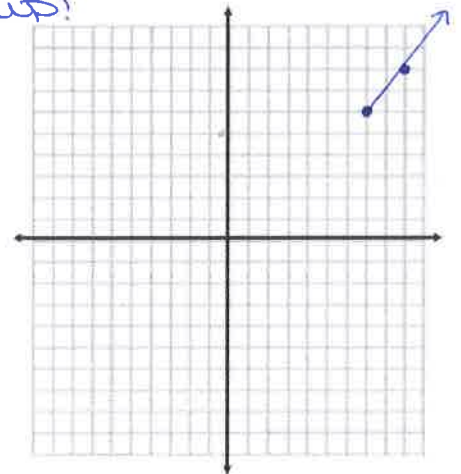
Examples: Write an absolute value function based on the following conditions.

A.) Write an absolute value equation with a vertex of $(7, 6)$ that passes through the point $(9, 8)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - 6}{9 - 7} = \frac{2}{2} = 1$$

opens up!

$$y = |x - 7| + 6$$

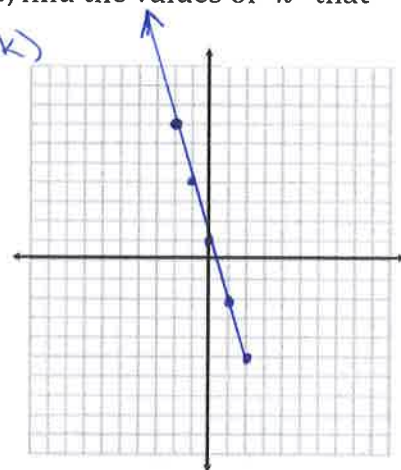


B.) Given the equation of an absolute value function $g(x) = 3|x - 2| + k$, find the values of "k" that ensures the graph passes through the point $(-2, 7)$

$$k = -5$$

vertex: $(2, k)$

slope: ± 3
opens up!



Method 1: Substitute into Equation

$$7 = 3|-2-2| + k$$

$$7 = 3|-4| + k$$

$$7 = 3(4) + k$$

$$7 = 12 + k$$

$$-5 = k$$

Method 2: Use the Slope

$$-3 = \frac{k-7}{2-2}$$

$$-3 = \frac{k-7}{4}$$

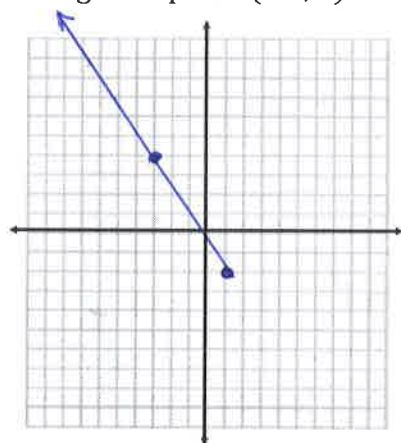
$$-12 = k-7 \quad k = -5$$

C.) Write an absolute value equation with a vertex of $(1, -2)$ that passes through the point $(-3, 4)$.

$$m = \frac{4 - (-2)}{-3 - 1} = \frac{6}{-4} = -\frac{3}{2}$$

$$y = \frac{3}{2}|x-1| - 2$$

opens up!



D.) Given the equation of an absolute value function $g(x) = 1|x - 2| + k$, find the values of "k" that ensures the graph passes through the point $(7, 2)$.

$$2 = 1|7-2| + k$$

$$2 = 1|5| + k$$

$$2 = 1(5) + k$$

$$2 = 5 + k$$

$$-3 = k$$

$$k = -3$$

vertex: $(2, k)$

slope: ± 1
opens up

