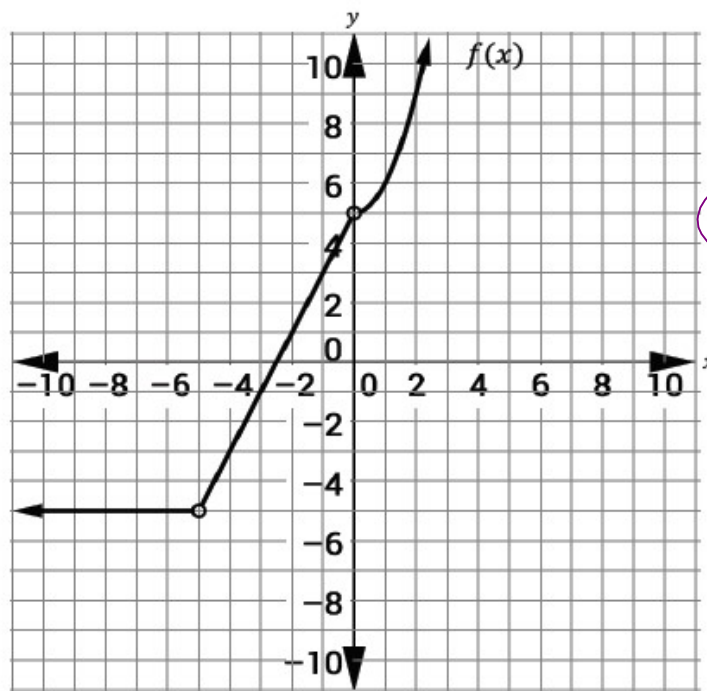


**Section 3 – Topic 7**  
**Transformations of Piecewise-Defined Functions**

Consider the following piecewise function  $f(x)$ .

$$f(x) = \begin{cases} -5, & x < -5 \\ 2x + 5, & -5 < x < 0 \\ x^2 + 5, & x > 0 \end{cases}$$



Domain  $x)$   
 $(-\infty, -5) \cup (-5, 0) \cup (0, \infty)$   
 Range  $y)$   
 $[-5, 5) \cup (5, \infty)$

**Let's Practice!**

1. Match each of the following transformations of  $f(x)$  with its description on the right.

H  $f(x+k), k > 0$     ~~A.~~ Compresses  $f(x)$  vertically by a factor of  $k$

E  $f(x+k), k < 0$     ~~B.~~ Shifts  $f(x)$  down  $|k|$  units

D  $f(x)+k, k > 0$     C. Stretches  $f(x)$  horizontally by a factor of  $k$

B  $f(x)+k, k < 0$     ~~D.~~ Shifts  $f(x)$  up  $k$  units

A  $k \cdot f(x), 0 < k < 1$     ~~E.~~ Shifts  $f(x)$  right  $|k|$  units

I  $k \cdot f(x), k > 1$     F. Reflects  $f(x)$  about the  $x$ -axis

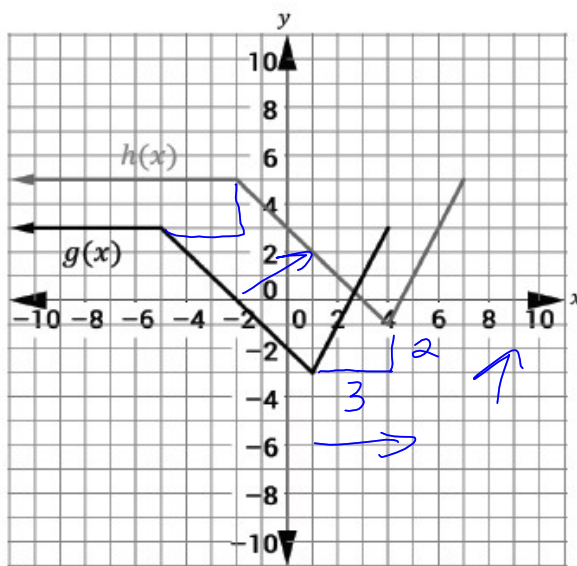
G  $f(k \cdot x), 0 < k < 1$     G. Compresses  $f(x)$  horizontally by a factor of  $k$

C  $f(k \cdot x), k > 1$     ~~H.~~ Shifts  $f(x)$  left  $|k|$  units

F  $k \cdot f(x), k = -1$     ~~I.~~ Stretches  $f(x)$  vertically by a factor of  $k$

Try It!

2. Consider the graphs of  $g(x)$  and  $h(x)$  below.



The function  $h(x) = g(x + a) + b$ . right 3

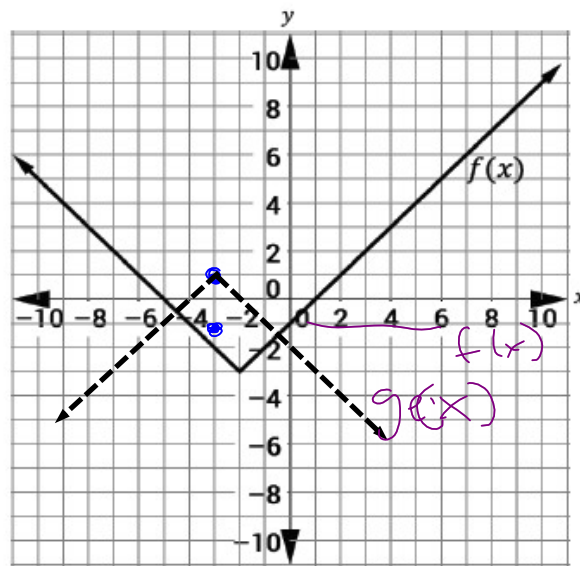
What are the values of  $a$  and  $b$ ?

$a = 3$     $b = 2$

$h(x) = g(x - 3) + 2$

**BEAT THE TEST!**

1. Consider the graph of the absolute value function shown below.



reflection over x-axis  
left 1  
up 2

If  $g(x) = -[f(x + 1) + 2]$ , which of the following are true? Select all that apply.

- The vertex of  $g(x)$  is  $(-1, 2)$ .
- The function  $g(x)$  is a reflection of  $f(x + 1) + 2$ .
- The function  $g(x) = x - 4$  when  $x > -3$ .
- The function  $g(x) = x + 4$  when  $x < -3$ .
- The function  $g(x)$  has a y-intercept at  $(0, -2)$ .