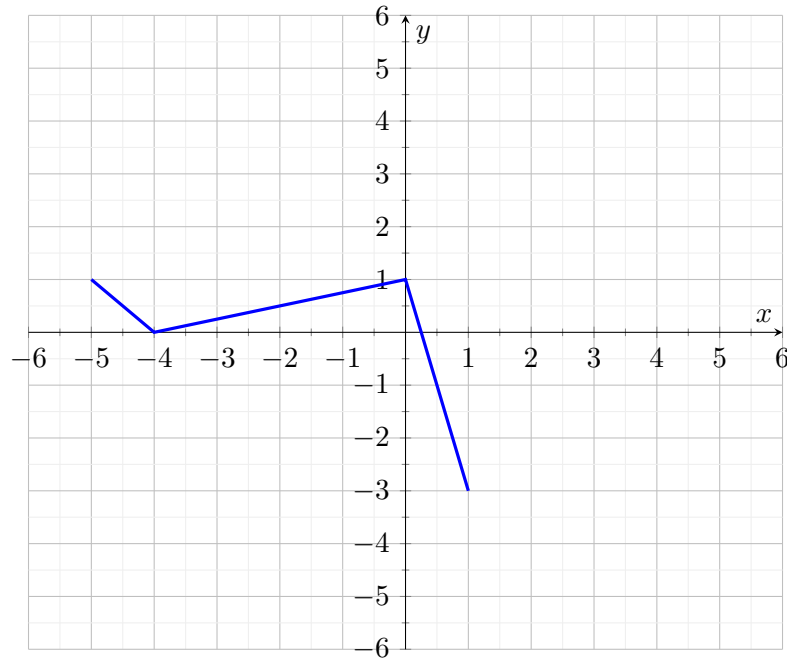


Think It Through

November 16

- Let $f(x) = x^2$, $g(x) = x^2 + 1$ and $h(x) = \sqrt{x}$. Determine each of the following.
 - $(f \circ g)(x)$
 - $(g \circ f)(x)$
 - $(g \circ f \times h)(x)$
 - $(g + h)(x)$
 - $(g - h)(x)$
- Let $g(x) = af(b(x - h) + k)$ be the function obtained by applying transformations to the graph of $f(x)$. Write down what transformations the parameters represent. (parameters are a , b , h , and k).
- Consider the function $f(x)$ below.



Draw $g(x)$ in each of the following circumstances and determine its new domain and range.

- $g(x) = 2f(x + 1)$
- $g(x) = -f(2x + 2)$
- $g(x) = -\frac{1}{2}f(-3x + 6) - 1$
- The relation that is acquired after each of the following transformations are applied to $f(x)$
 - Reflection in the x -axis
 - Stretch by a factor of 2 in the y -axis
 - Reflection in the line $y = x$
 - Vertical translation 3 units down

4. Let $f(x) = |x + 3|$, $x > 0$. Each of the following transformations are applied to $f(x)$ to arrive at $g(x)$.

- Shifted 3 units up
- translated 4 units right
- Reflection in y -axis
- Shifted 2 units down
- Stretch by a factor of a in the x -axis

Find a so that $g(-20) = 4$

5. Let $f(x) = \sqrt{x}$. Each of the following transformations are applied to $f(x)$ to arrive at $g(x)$

- reflection in the line $y = x$
- stretch by a factor of 2 about the y -axis
- Shift 3 units up
- Stretch by a factor of 2 in the x -axis

Write the function $g(x)$ in terms of x .

6. Let $f(x) = \frac{1}{x}$. Write the function $g(x) = 2f(-3(x + 1)) + 1$ in terms of x and describe what transformations occurred in what order.

7. Let $f(x) = \frac{1}{2}(3(x + 1))^2$ and $g(x) = 3x^2 + 2$. Describe the transformations that occur to transform $f(x)$ to $g(x)$ (be sure to include order).

8. ★ Let $f(x) = \sqrt{x} + 1$. each of the following transformations are applied to $f(x)$ to arrive at the function $g(x)$

- Stretch by a factor of $\frac{1}{3}$ about the line $x = 1$
- Reflection in the line $y = x$
- Stretch by a factor of a about the line $y = -2$

Find a so that $g(3) = 4$