

## Chapter 1 Test

### Multiple Choice

For #1 to #6, choose the best answer.

1. The graph  $y = f(x)$  contains the point  $(3, 4)$ . After a transformation, the point  $(3, 4)$  is transformed to  $(5, 5)$ . Which of the following is a possible equation of the transformed function?

A  $y + 1 = f(x + 2)$   
 B  $y + 1 = f(x - 2)$   
 C  $y - 1 = f(x + 2)$   
 D  $y - 1 = f(x - 2)$

2. The graph of  $y = |x|$  is transformed by a vertical stretch by a factor of 3 about the  $x$ -axis, and then a horizontal translation of 3 units left and a vertical translation up 1 unit. Which of the following points is on the transformed function?

A  $(0, 0)$   
 B  $(1, 3)$   
 C  $(-3, 1)$   
 D  $(3, 1)$

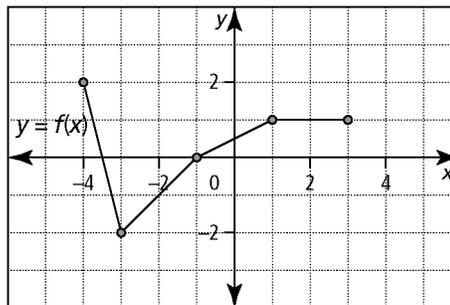
3. The graph of  $y = \sqrt{x}$  is vertically stretched by a factor of 2 about the  $x$ -axis, then reflected about the  $y$ -axis, and then horizontally translated left 3. What is the equation of the transformed function?

A  $y = 2\sqrt{-x - 3}$   
 B  $y = 2\sqrt{-x + 3}$   
 C  $y = -2\sqrt{x + 3}$   
 D  $y = -2\sqrt{x - 3}$

4. Which of the following transformations would produce a graph with the same  $x$ -intercepts as  $y = f(x)$ ?

A  $y = -f(x)$   
 B  $y = f(-x)$   
 C  $y = f(x + 1)$   
 D  $y = f(x) + 1$

5. Given the graph of  $y = f(x)$ , what is the invariant point under the transformation  $y = f(-2x)$ ?



A  $(-1, 0)$       B  $(0, \frac{1}{2})$   
 C  $(1, 1)$       D  $(3, 1)$

6. What will the transformation of the graph of  $y = f(x)$  be if  $y$  is replaced with  $-y$  in the equation  $y = f(x)$ ?

A It will be reflected in the  $x$ -axis.  
 B It will be reflected in the  $y$ -axis.  
 C It will be reflected in the line  $y = x$ .  
 D It will be reflected in the line  $y = -1$ .

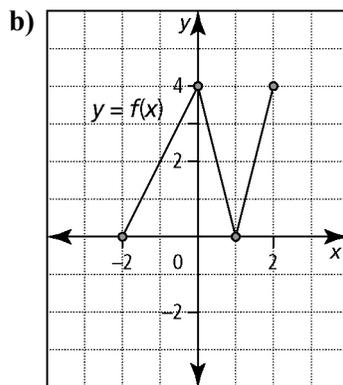
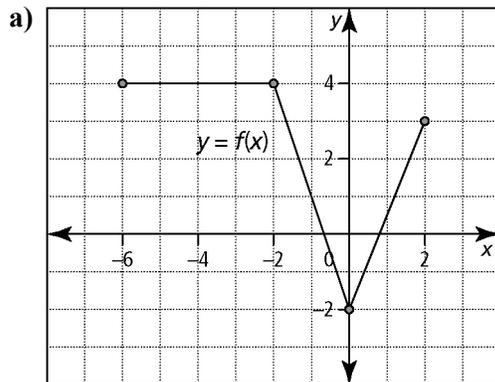
### Short Answer

7. If the range of function  $y = f(x)$  is  $\{y \mid y \geq 4\}$ , state the range of the new function  $g(x) = f(x + 2) - 3$ .
8. As a result of the transformation of the graph of  $y = f(x)$  into the graph of  $y = -3f(x + 2) - 5$ , the point  $(2, 5)$  becomes point  $(x, y)$ . Determine the value of  $(x, y)$ .
9. The graph of  $f(x)$  is stretched horizontally by a factor of  $\frac{1}{2}$  about the  $y$ -axis and then stretched vertically by a factor of  $\frac{1}{3}$  about the  $x$ -axis. Determine the equation of the transformed function.
10. A function  $f(x) = x^2 - x - 2$  is multiplied by a constant value  $k$  to create a new function  $g(x) = kf(x)$ . If the graph of  $y = g(x)$  passes through the point  $(3, 14)$ , state the value of  $k$ .

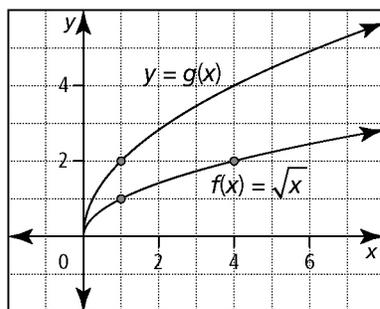


**Extended Response**

11. Copy the graph of each relation. Then, sketch the graph of the inverse relation.

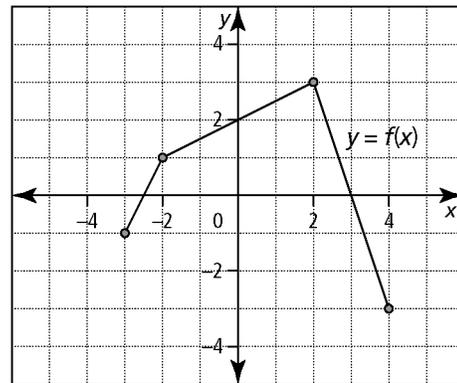


12. The graphs of  $y = f(x)$  and  $y = g(x)$  are shown.



- If the point  $(1, 1)$  on  $y = f(x)$  maps onto the point  $(1, 2)$  on  $y = g(x)$ , describe the transformation and state the equation of  $g(x)$ .
- If the point  $(4, 2)$  on  $y = f(x)$  maps onto the point  $(1, 2)$  on  $y = g(x)$ , describe the transformation and state the equation of  $g(x)$ .

13. Consider the graph of the function  $y = f(x)$ .



- Describe the transformation of  $y = f(x)$  to  $y = 3f(-2(x - 1)) + 4$ .
  - Sketch the graph.
14. A function is defined by  $f(x) = (x + 2)(x - 3)$ .
- If  $g(x) = kf(x)$ , describe how  $k$  affects the  $y$ -intercept of the graph of the function  $y = g(x)$  compared to  $y = f(x)$ .
  - If  $h(x) = f(mx)$ , describe how  $m$  affects the  $x$ -intercepts of the graph of the function  $y = h(x)$  compared to  $y = f(x)$ .
15. Complete the following for the quadratic function  $f(x) = x^2 - 2x + 1$ .
- Write the equation of  $f(x)$  in the form  $y = a(x - h)^2 + k$ .
  - Determine the coordinates of the vertex of  $x = f(y)$ .
  - State the equation of the inverse.
  - Restrict the domain of  $y = f(x)$  so that its inverse is a function.

