1. Write the mapping notation to describe how the graphs of the following functions can be obtained from the graph of $y = f(x)$.

   a) $y - 3 = f(5x)$

   b) $2y - 6 = f(4(x + 1)$

   c) $y = f(3x + 6) + 1$

2. Write the equation of the transformation in the form $y = af(b(x - h)) + k$ after the transformations described.

   a) $y = g(x)$ is translated 4 units down, 3 units to the left and horizontally stretched by a factor of 5.

   b) $y = g(x)$ is translated 2 units up, 5 units to the right, reflected in the x-axis and vertically stretched by a factor of 3.

3. The mapping rule $(x, y) \to (2x-1, y+3)$ is applied to the function $y = f(x)$. What is the equation of the resulting function?

A) $y = f(2(x-1))+3$
B) $y = f(2(x+1))-3$
C) $y = f\left(\frac{1}{2}(x-1)\right)-3$
D) $y = f\left(\frac{1}{2}(x+1)\right)+3$

4. The domain of $y = f(x)$ is $\{x \mid -4 \le x \le 8, x \in R\}$ and the range is $\{y \mid -6 \le x \le 12, x \in R\}$. What are the domain and range of $g(x) = \frac{1}{3}g(2x)$?

5. The point (-4, 10) lies on the graph of $f(x)$. What is the image point on the graph of $y = -3f(2x-6)+1$?

6. Consider the function $f(x) = (x+4)(x-5)$. What are the zeros of the function if the graph is transformed by a horizontal stretch factor of 3 and reflected over the *y*-axis?

A) $(-12,0)$ *and* $(15,0)$
B) $\left(-\frac{4}{3},0\right)$ *and* $\left(\frac{5}{3},0\right)$
C) $(12,0)$ *and* $(-15,0)$
D) $\left(\frac{4}{3},0\right)$ *and* $\left(-\frac{5}{3},0\right)$

7. If the function $y = f(x)$ is horizontally stretched by a factor of $\frac{1}{4}$ and translated 5 units to the left and 1 unit downward, what is the new transformed equation?

A) $y = f\left(\frac{1}{4}(x-5)\right)-1$

B) $y = f\left(\frac{1}{4}(x+5)\right)+1$

C) $y = f\left(4(x-5)\right)-1$

D) $y = f\left(4(x+5)\right)-1$

8. What is the horizontal stretch factor of $\frac{1}{2}y = f(-5x)$?

A) -5

B) $-\frac{1}{5}$

C) $\frac{1}{5}$

D) 5

9. What is the horizontal translation of the transformed function $y = 2f(-3x+6)+1$?

A) 6 units left

B) 2 units left

C) 2 units right

D) 6 units right

10. What is the vertical translation of the transformed function $3y-6 = f(x+6)$?

A) 6 units up

B) 6 units down

C) 2 units up

D) 2 units down

11. The point (a,b) is on the graph of $y = f(x)$. What are the coordinates of the image of this point on the graph of $y + b = f(x+1)$?

A) $(a-1, 2b)$
B) $(a+1, 2b)$
C) $(a-1, 0)$
D) $(a+1, 0)$

12. Which mapping rule would map the function $y = f(x)$ onto the function $y = f\left(-\frac{1}{3}x + 3\right)$?

A) $(x, y) \rightarrow (-3x+1, y)$
B) $(x, y) \rightarrow (-3x+9, y)$
C) $(x, y) \rightarrow \left(-\frac{1}{3}x + 1, y\right)$
D) $(x, y) \rightarrow \left(-\frac{1}{3}x + 9, y\right)$

13. The transformation $y = -3f(4(x-1)) + 2$ is best described as:

A) Reflection about the x- axis; a vertical stretch factor of 3 and a horizontal stretch factor of 4; translation 1 unit to the left and 2 units up.

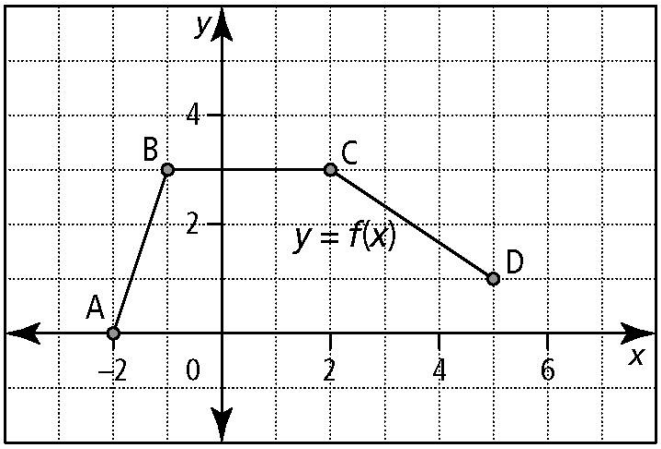
B) Reflection about the x- axis; a vertical stretch factor of 3 and a horizontal stretch factor of $\frac{1}{4}$; translation 1 unit to the right and 2 units up.

C) Reflections about the y- axis; a vertical stretch factor of 3 and a horizontal stretch factor of $\frac{1}{4}$; translation 1 unit to the right and 2 units up.

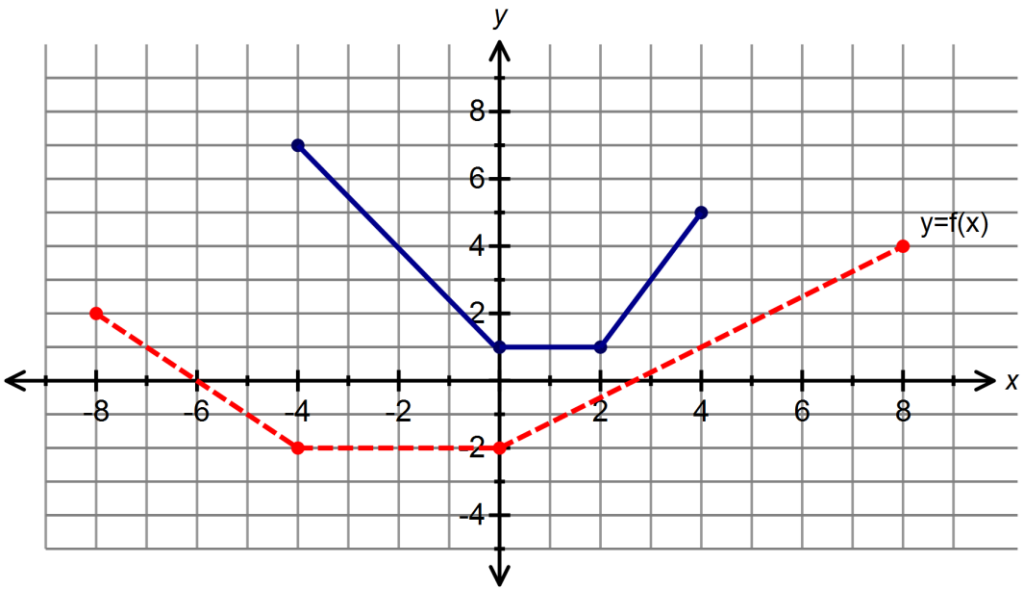
D) Reflections about the y- axis; a vertical stretch factor of 3 and a horizontal stretch factor of 4; translation 1 unit to the right and 2 units up.

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

Use the function $y - 5 = f(-\frac{1}{2}(x+3))$ to state the coordinates of the image points A′, B′, C′, and D′.



15. Determine the equation of the transformed graph $y = af(b(x-h)) + k$ given the graph of $y = f(x)$.



16. What is the inverse of $y = 2x^2 - 8$.

A) $y = \dfrac{x^2 + 8}{2}$

B) $y = \pm\sqrt{\dfrac{x+8}{2}}$

C) $y = \pm\sqrt{x+4}$

D) $y = 8 \pm \sqrt{\dfrac{x}{2}}$

17. Algebraically determine the equation of the inverse of $f(x) = 2x^2 + 8x + 1$. Identify a restricted domain for which the function has an inverse that is also a function.

18. Given the graph of the function $y = f(x)$ below, sketch the inverse graph of $y = 3f(-2(x-1)) + 1$