

Section 1.3 Extra Practice

1. Match the mapping with the correct transformation.

Mapping

Transformation

- a) $(x, y) \rightarrow \left(\frac{1}{4}x, y\right)$ **A** vertical stretch by a factor of 4
- b) $(x, y) \rightarrow (x, y + 4)$ **B** horizontal stretch by a factor of $\frac{1}{4}$
- c) $(x, y) \rightarrow (x + 4, y)$ **C** vertical translation up 4 units
- d) $(x, y) \rightarrow (x, 4y)$ **D** horizontal translation right 4 units

2. Write the equation for each transformation of $y = x^2$ in the form $y = af(b(x - h)) + k$.

- a) a vertical stretch by a factor of 3, reflected in the y-axis, and translated 3 units left and 2 units down
- b) a horizontal stretch by a factor of 2, reflected in the x-axis, and translated 7 units up
- c) a horizontal stretch by a factor of $\frac{1}{4}$, translated 5 units right and 1 unit down
- d) a vertical stretch by a factor of $\frac{1}{3}$, a horizontal stretch by a factor of $\frac{1}{2}$, and reflected in the x-axis

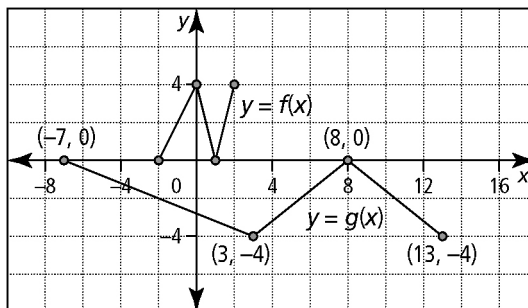
3. Rewrite each of the following equations in the form $y = af(b(x - h))$.

- a) $y = 2f(-x - 6)$
- b) $-y = f(2x + 10)$
- c) $-2y = f(-3x + 12)$
- d) $\frac{1}{4}y = f(9 - x)$

4. Describe the combination of transformations that must be applied to the function $y = f(x)$ in order to obtain each transformed function.

- a) $y = 2f(5x - 15)$
- b) $-4y = f(7 - x)$
- c) $y = f(3x + 12)$

5. The graph of the function $y = g(x)$ represents a transformation of the graph of $y = f(x)$. Determine the equation of $g(x)$ in the form $y = af(b(x - h)) + k$.



6. The key point $(-18, 12)$ is on the graph of $y = f(x)$. What is its image point under each transformation of the graph of $f(x)$?

- a) $y = f(x - 6) - 8$
- b) $y = 2f(6x)$
- c) $y - 4 = -3f(x + 5)$
- d) $y = -f(0.5x)$

KEY**1. a) B b) C c) D d) A****2. a) $y = 3(-(x + 3))^2 - 2$** **b) $y = -\left(\frac{1}{2}x\right)^2 + 7$ c) $y = (4(x - 5))^2 - 1$** **d) $y = -\frac{1}{3}(2x)^2$** **3. a) $y = 2f(-(x + 6))$ b) $y = -f(2(x + 5))$** **c) $y = -\frac{1}{2}f(-3(x - 4))$ d) $y = 4f(-(x - 9))$** **4. a) vertically stretched by a factor of 2, horizontally stretched by a factor of $\frac{1}{5}$, translated 3 units right****b) vertically stretched by a factor of $\frac{1}{4}$, reflected in the x -axis, reflected in the y -axis, translated 7 units right****c) horizontally stretched by a factor of $\frac{1}{3}$, translated 4 units left****5. $y = -f\left(\frac{1}{5}(x - 3)\right)$** **6. a) $(-12, 4)$ b) $(-3, 24)$** **c) $(-23, -32)$ d) $(-36, -12)$**