Chapter 1 BLM Answers

BLM 1–2 Section 1.1 Extra Practice

1. a) \( y - 3 = f(x) \) is a translation of \( f(x) \) 3 units up; \( y + 2 = f(x) \) is a translation of \( f(x) \) 2 units down

2. a) \( y = f(x + 4) \) is a translation of \( f(x) \) 4 units left, and \( y = f(x - 5) \) is a translation of \( f(x) \) 5 units right

3. a) \( (x, y) \rightarrow (x + 3, y + 6) \) b) \( (x, y) \rightarrow (x, y - 4) \) c) \( (x, y) \rightarrow (x - 2, y + 4) \) d) \( (x, y) \rightarrow (x + 1, y - 2) \)

4. a) translation 2 units left, 3 units up b) translation 5 units right, 7 units down c) translation 4 units left d) translation 6 units up

5. a) \( A'(−5, 5), B'(−4, 8), C'(−1, 8), D'(2, 6) \) b)

6. a) translation left 1 unit, down 4 units b) \( y + 4 = f(x + 1) \)

7. a) \( k = 2, h = -3; y - 2 = f(x + 3)^2 \) b) \( k = -1, h = 5; y + 1 = f|x - 5| \) c) \( k = -5, h = 9; y + 5 = g(x - 9) \)

d) \( k = 9, h = -4; y - 9 = f\left(\frac{1}{x} + 4\right) \)

8. 4 units down

BLM 1–3 Section 1.2 Extra Practice

1. a) \[
\begin{array}{c|c}
\text{x} & \text{f(x)} \\
\hline
-3 & -10 \\
-2 & -8 \\
-1 & -6 \\
0 & -4 \\
1 & -2 \\
2 & 0 \\
3 & 2 \\
\end{array}
\]

2. a) \[
\begin{array}{c|c}
\text{x} & \text{f(x)} \\
\hline
1 & 9 \\
2 & 4 \\
3 & 1 \\
4 & 0 \\
5 & 1 \\
6 & 4 \\
7 & 9 \\
\end{array}
\]

b)
c) \( h(x) \) is a reflection of \( f(x) \) in the \( y \)-axis.
d) \((0, 16)\)

3. a) 

b) It is the graph of \( y = f(x) \) after a horizontal stretch about the \( x \)-axis by a factor of 3.
c) \( A(-2, 0) \)

4. a)

b) It is the graph of \( y = f(x) \) after a vertical stretch about the \( y \)-axis by a factor of 2.
c) \( (0, 16) \)

d) \((0, 16)\)

e) \((0, 16)\)

5. a) \((x, y) \rightarrow (x, 3y)\)  
b) \((x, y) \rightarrow (-x, y)\)  
c) \((x, y) \rightarrow (x, -y)\)  
d) \((x, y) \rightarrow \left(\frac{1}{3}x, y\right)\)

6. a) a horizontal stretch about the \( y \)-axis by a factor of \( \frac{1}{3} \)
b) a horizontal stretch about the \( y \)-axis by a factor of 4
c) a reflection in the \( x \)-axis, a vertical stretch about the \( x \)-axis by a factor of \( \frac{1}{2} \)
d) a reflection in the \( y \)-axis, a horizontal stretch about the \( y \)-axis by a factor of 2
e) a vertical stretch about the \( x \)-axis by a factor of \( \frac{1}{4} \)
f) a vertical stretch about the \( x \)-axis by a factor of \( 5 \)

7. a) a reflection in the \( x \)-axis, a horizontal stretch about the \( y \)-axis by a factor of 3; \( h(x) = -f\left(\frac{1}{3}x\right) \)

8. The domain of \( y = g(x) \) is \( \{x | -8 \leq x \leq 16, x \in \mathbb{R}\} \); the range is \( \{y | -2 \leq y \leq 4, y \in \mathbb{R}\} \).

9. The domain of \( y = g(x) \) is \( \{x | -4 \leq x \leq 6, x \in \mathbb{R}\} \); the range is \( \{y | -12 \leq y \leq 6, y \in \mathbb{R}\} \).

10. \((-15, 0)\), \((12, 0)\)

BLM 1–4 Section 1.3 Extra Practice

1. a) interchange the \( x \)-coordinate and \( y \)-coordinate of the graph or equation
   b) \( y = f^{-1}(x) \) or \( x = f(y) \)
   c) \((x, y) \rightarrow (y, x)\)

2. a) 

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
   d) \( \left(\frac{a}{2}, 0\right) \); \((0, -b - 6)\)

BLM 1–5 Section 1.4 Extra Practice

1. a) 

b) \( y = f^{-1}(x) \) or \( x = f(y) \)

2. a) 

b) 

BLM 1–8
3. a) The inverse of a), b), and d) are not functions. A vertical line intersects the graph of the inverse at more than one point. This means that the relation is not a function.

4. a) \( f^{-1}(x) = \frac{1}{3}x + 2 \)  
   b) \( f^{-1}(x) = 2x - 10 \)
   c) \( f^{-1}(x) = 3x - 12 \)  
   d) \( f^{-1}(x) = \frac{1}{2}x - \frac{3}{2} \)

5. a) \hspace{2in}  
   b) \hspace{2in} 

domain: \( \{x \mid x \in \mathbb{R}\} \); range: \( \{y \mid y \geq 5, y \in \mathbb{R}\} \)

c) Restrict the domain to \( \{x \mid x \geq 3, x \in \mathbb{R}\} \) or \( \{x \mid x \leq 3, x \in \mathbb{R}\} \).

6. a) \( f^{-1}(x) = \pm\sqrt{x - 4} \)  
   b) \( f^{-1}(x) = \pm\sqrt{x + 7} \)
   c) \( f^{-1}(x) = \pm\sqrt{x - 5} + 2 \)  
   d) \( f^{-1}(x) = \pm\sqrt{x + 9} + 5 \)

7. a) \( x \geq 0 \) or \( x \leq 0 \)  
   b) \( x \geq -4 \) or \( x \leq -4 \)
   c) \( x \geq 3 \) or \( x \leq 3 \)  
   d) \( x \geq 0 \) or \( x \leq 0 \)

8. a) 12  
   b) 6  
   c) 16  
   d) 8

9. a) \hspace{2in}  
   b) \hspace{2in} 
   c) \hspace{2in}

The inverse is a function.

The inverse is a function.

The inverse is not a function.

The inverse is not a function.