

For each of the following, find the equation of the inverse $f^{-1}(x)$.

1. $y = (x - 5)^2$

4. $f(x) = \frac{x}{x+2}$

2. $y = \sqrt{x} + 2$

5. $f(x) = \frac{3x-1}{2x+4}$

3. $y = \sqrt[3]{x-1}$

6. $f(x) = \frac{ax-b}{cx-d}$

7. If $f(x) = \frac{1}{2}x + 3$, find $f^{-1}(f(x))$.

If (x, y) is point on the graph of $y = f(x)$, what is the corresponding point on each of the following?

8. $y = f^{-1}(x-1)$

9. $y = f^{-1}(x+3) - 4$

10. $y = 3 - f(x)$

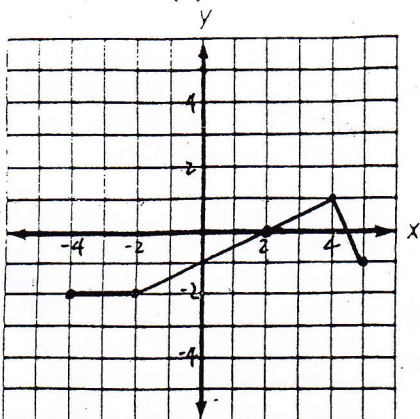
If $(-2, 1)$ is a point on the graph of $y = f(x)$, what is the corresponding point on each of the following?

11. $y - 2 = -f(-x)$

12. $y = f(-x + 8)$

13. $y = -f^{-1}(-x)$

14. Given $y = f(x)$. Sketch the following graphs.



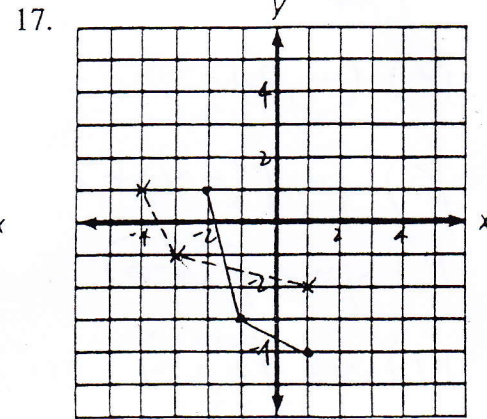
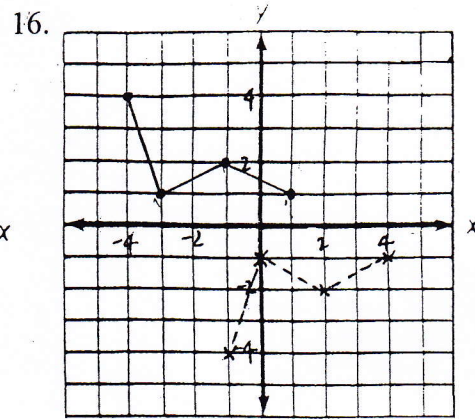
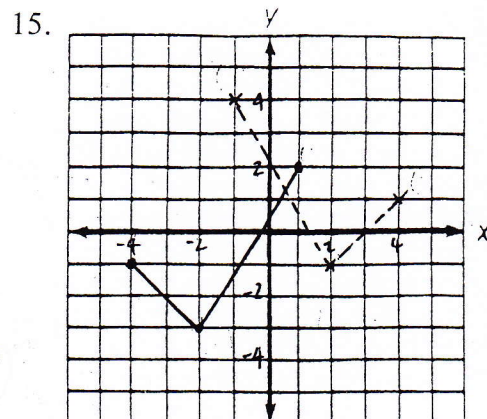
a) $y = -f(x) + 3$

b) $y = f(-x + 2)$

c) $y = f^{-1}(x)$

d) $y = f^{-1}(x - 4) - 2$

Find an equation that could represent a transformation of $y = f(x)$ into the broken line graph.



ANSWERS:

1) $y = \sqrt{x} + 5$

2) $y = (x-2)^2$

3) $y = x^3 + 1$

4) $y = \frac{-2x}{x-1}$

5) $y = \frac{-4x-1}{2x-3}$

6) $y = \frac{xd-b}{xc-a}$

7) $f^{-1}(f(x)) = x$

8) $(y+1, x)$

9) $(y-3, x-4)$

10) $(x, -y+3)$

11) $(2, 1)$

12) $(10, 1)$

13) $(-1, 2)$

15) $y = f(-x) + 2$

16) $y = -f(x-3)$

17) $y = f^{-1}(x)$

REFLECTIONS

$$1) \quad y = (x-5)^2$$

$$x = (y-5)^2$$

$$\sqrt{x} = y-5$$

$$y = \sqrt{x} + 5$$

$$(2) \quad y = \sqrt{x} + 2$$

$$x = \sqrt{y} + 2$$

$$x-2 = \sqrt{y}$$

$$y = (x-2)^2$$

$$(3) \quad y = \sqrt[3]{x-1}$$

$$x = \sqrt[3]{y-1}$$

$$x^3 = y-1$$

$$y = x^3 + 1$$

$$4) \quad y = \frac{x}{x+2}$$

$$x = \frac{y}{y+2}$$

$$x(y+2) = y$$

$$xy + 2x = y$$

$$xy - y + 2x = 0$$

$$y(x-1) + 2x = 0$$

$$y = \frac{-2x}{x-1}$$

$$(5) \quad y = \frac{3x-1}{2x+4}$$

$$x = \frac{3y-1}{2y+4}$$

$$x(2y+4) = 3y-1$$

$$2xy + 4x = 3y-1$$

$$2xy - 3y = -4x-1$$

$$y(2x-3) = -4x-1$$

$$y = \frac{-4x-1}{2x-3}$$

$$(6) \quad y = \frac{ax-b}{cx-d}$$

$$x = \frac{ay-b}{cy-d}$$

$$x(cy-d) = ay-b$$

$$xcy - xd = ay-b$$

$$xcy - ay = xd-b$$

$$y(xc-a) = xd-b$$

$$y = \frac{xd-b}{xc-a}$$

$$7) \quad f(x) = \frac{1}{2}x + 3$$

$$f^{-1} = 2x-6$$

$$f^{-1}(f(x)) = 2\left(\frac{1}{2}x + 3\right) - 6$$

$$= x + 6 - 6$$

$$= x$$

$$(8) \quad (x, y) \rightarrow (y, x) \rightarrow (y+1, x)$$

$$(9) \quad (x, y) \rightarrow (y, x) \rightarrow (y-3, x-4)$$

$$(10) \quad (x, y) \rightarrow (x, -y) \rightarrow (x, -y+3)$$

$$11) \quad (-2, 1) \rightarrow (2, -1+2) \rightarrow (2, 1)$$

$$12) \quad (-2, 1) \rightarrow (2, 1) \rightarrow (2-8, 1) \rightarrow (-6, 1)$$

$$13) \quad (-2, 1) \rightarrow (2, 1) \rightarrow (-1, 2)$$

$$15) \quad y = f(-x) + 2$$

$$(16) \quad y = -f(x-3) - 2$$

$$(17) \quad y = f^{-1}(x)$$