ANSWER PRESENTATION TOOL

Algebra 2 - Student Edit 5 7 - Practice 1-53 ALL EVEN Show Solı

ODD

1. $y = 3x + 5$

$y - 5 = 3x$

$\frac{y-5}{3} = x$

Find the input when $y = -3$.

$x = \frac{-3-5}{3} = -\frac{8}{3}$

So, the input is $-\frac{8}{3}$ when the output is -3.

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

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

$2(y + 3) = x$

$2y + 6 = x$

Find the input when $y = -3$.

$x = 2(-3 + 3)$

$= 2(0)$

$= 0$

So, the input is 0 when the output is -3.

5. $y = 3x^3$

$$\frac{y}{3} = x^3$$

$$\sqrt[3]{\frac{y}{3}} = x$$

Find the input when $y = -3$.

$$x = \sqrt[3]{\frac{-3}{3}}$$

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

$$= -1$$

So, the input is -1 when the output is -3.

7. $y = (x - 2)^2 - 7$

$$y + 7 = (x - 2)^2$$

$$\pm\sqrt{y + 7} = x - 2$$

$$\pm\sqrt{y + 7} + 2 = x$$

Find the input when $y = -3$.

$$x = \pm\sqrt{-3 + 7} + 2$$

$$= \pm\sqrt{4} + 2$$

$$= \pm 2 + 2$$

$$= 0 \text{ or } 4$$

So, the input is 0 or 4 when the output is -3.

9. Method 1 Use inverse operations in reverse order.

$f(x) = 6x$

To find the inverse, apply inverse operations in the reverse order.

$f^{-1}(x) = \frac{1}{6}x$

The inverse of f is $f^{-1}(x) = \frac{1}{6}x$.

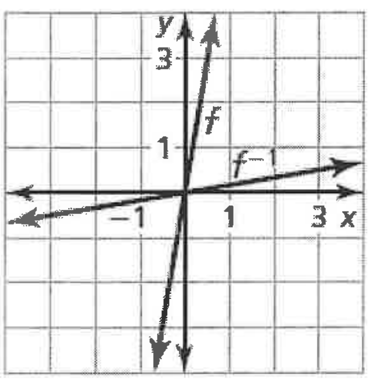
Method 2 Set y equal to $f(x)$. Switch the roles of x and y and solve for y.

$y = 6x$

$x = 6y$

$\frac{1}{6}x = y$

The inverse of f is $f^{-1}(x) = \frac{1}{6}x$.



11. Method 1 Use inverse operations in reverse order.

$f(x) = -2x + 5$

To find the inverse, apply inverse operations in the reverse order.

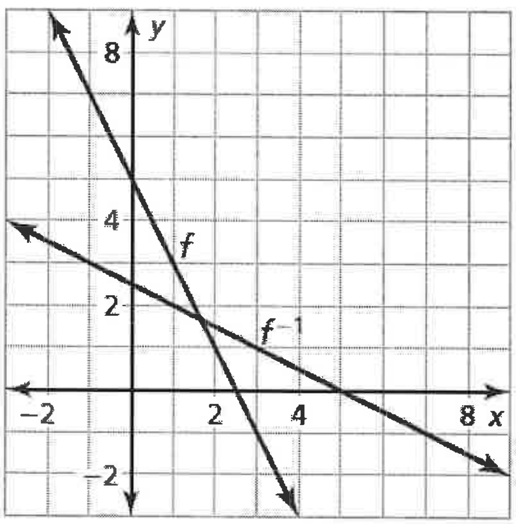
$f^{-1}(x) = -\frac{1}{2}(x - 5)$

The inverse of f is $g(x) = -\frac{1}{2}(x - 5)$ or $f^{-1}(x) = -\frac{1}{2}x + \frac{5}{2}$.

Method 2 Set y equal to $f(x)$. Switch the roles of x and y and solve for y.

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

The inverse of f is $g(x) = -\frac{1}{2}(x - 5)$ or $f^{-1}(x) = -\frac{1}{2}x + \frac{5}{2}$.



13. Method 1 Use inverse operations in reverse order.

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

To find the inverse, apply inverse operations in the reverse order.

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

The inverse of f is $g(x) = -2(x - 4)$ or $f^{-1}(x) = -2x + 8$.

Method 2 Set y equal to $f(x)$. Switch the roles of x and y and solve for y.

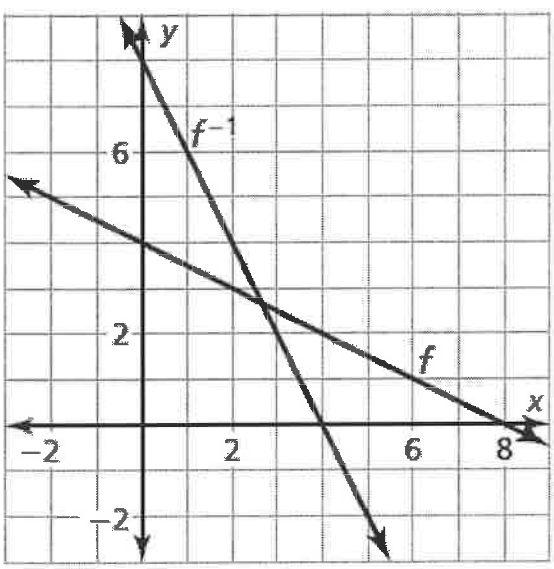
$$y = -\frac{1}{2}x + 4$$

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

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

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

The inverse of f is $g(x) = -2(x - 4)$ or $f^{-1}(x) = -2x + 8$.



15. Method 1 Use inverse operations in reverse order.

$f(x) = \frac{2}{3}x - \frac{1}{3}$

To find the inverse, apply inverse operations in reverse order.

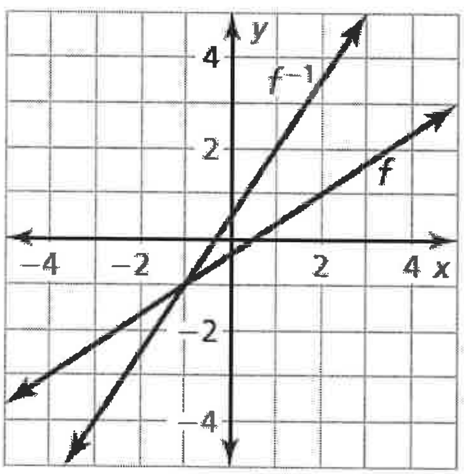
$f^{-1}(x) = \frac{3}{2}\left(x + \frac{1}{3}\right)$

The inverse of f is $g(x) = \frac{3}{2}\left(x + \frac{1}{3}\right)$, or $f^{-1}(x) = \frac{3}{2}x + \frac{1}{2}$.

Method 2 Set y equal to $f(x)$. Switch the roles of x and y and solve for y.

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

The inverse of f is $g(x) = \frac{3}{2}\left(x + \frac{1}{3}\right)$, or $f^{-1}(x) = \frac{3}{2}x + \frac{1}{2}$.



17. The functions are inverses because the coordinates switch roles.

19. $f(x) = 4x^2, x \leq 0$

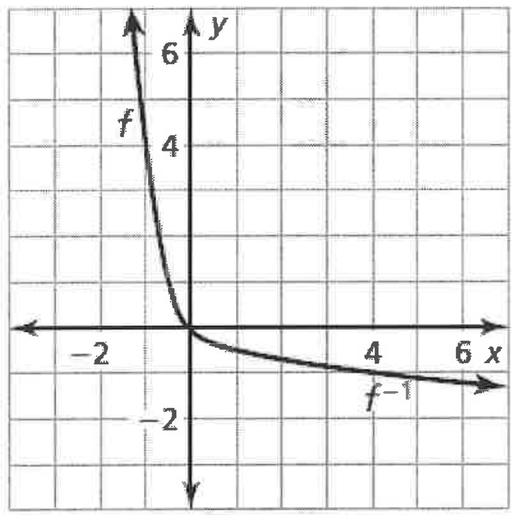
$$y = 4x^2$$

$$x = 4y^2$$

$$\frac{x}{4} = y^2$$

$$\pm\frac{\sqrt{x}}{2} = y$$

The domain of f is restricted to nonpositive values of x. So, the range of the inverse must also be restricted to nonpositive values. So, the inverse of f is $f^{-1}(x) = -\frac{\sqrt{x}}{2}$.



21. $f(x) = (x - 3)^2,\ x \geq 3$

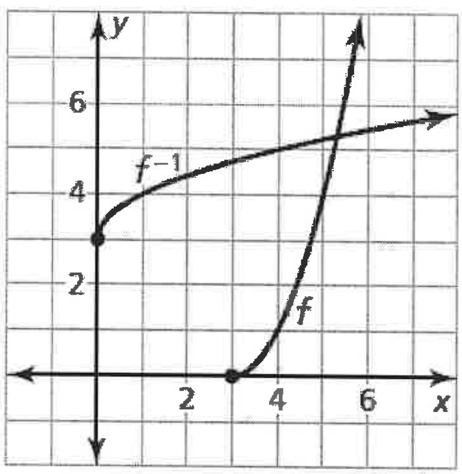
$$y = (x - 3)^2$$

$$x = (y - 3)^2$$

$$\pm\sqrt{x} = y - 3$$

$$3 \pm \sqrt{x} = y$$

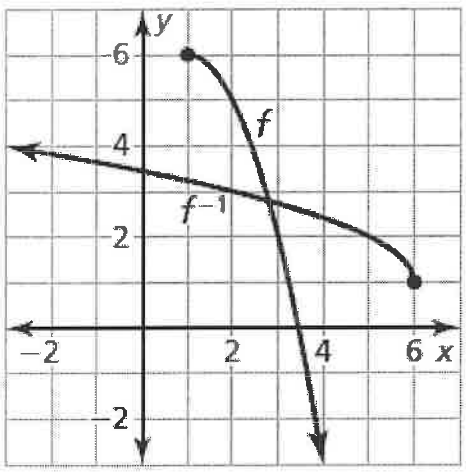
The domain of f is restricted to values greater than or equal to 3. So, the range of the inverse must also be restricted to values greater than or equal to 3. So, the inverse of f is $f^{-1}(x) = \sqrt{x} + 3$.



23.

$$f(x) = -(x-1)^2 + 6,\ x \geq 1$$
$$y = -(x-1)^2 + 6$$
$$x = -(y-1)^2 + 6$$
$$x - 6 = -(y-1)^2$$
$$6 - x = (y-1)^2$$
$$\pm\sqrt{6-x} = y - 1$$
$$1 \pm \sqrt{6-x} = y$$

The domain of f is restricted to values greater than or equal to 1. So, the range of the inverse must also be restricted to values greater than or equal to 1. So, the inverse of f is $f^{-1}(x) = \sqrt{6-x} + 1$.



25. When switching x and y, the negative should not be switched with the variables;

$$y = -x + 3$$
$$x = -y + 3$$
$$-x + 3 = y$$

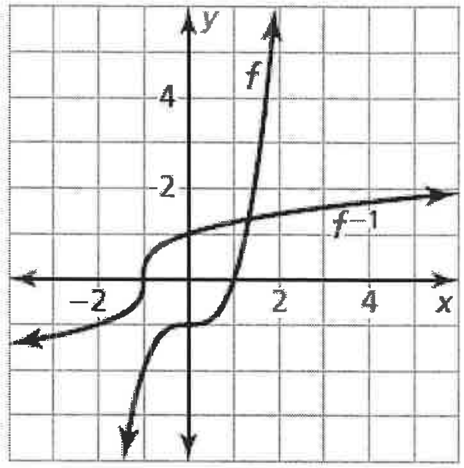
So, $f^{-1}(x) = -x + 3$.

27. f does not have an inverse function because the graph of f does not pass the horizontal line test.

29.

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

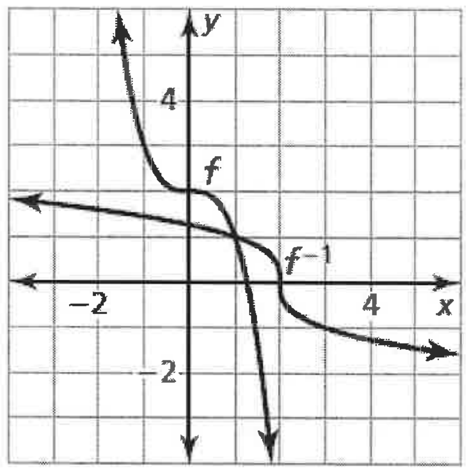
So, the inverse of f is $f^{-1}(x) = \sqrt[3]{x + 1}$.



31.

$$f(x) = -x^3 + 2$$
$$y = -x^3 + 2$$
$$x = -y^3 + 2$$
$$x - 2 = -y^3$$
$$2 - x = y^3$$
$$\sqrt[3]{2 - x} = y$$

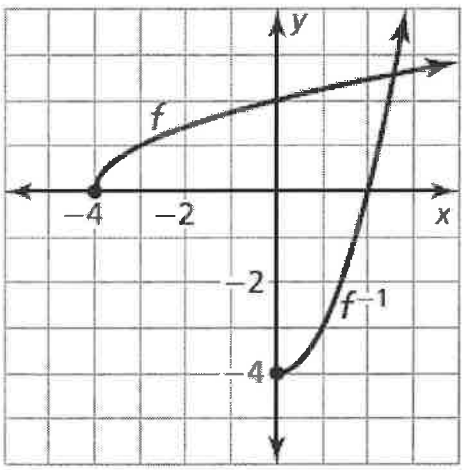
So, the inverse of f is $f^{-1}(x) = \sqrt[3]{-x + 2}$.



33.

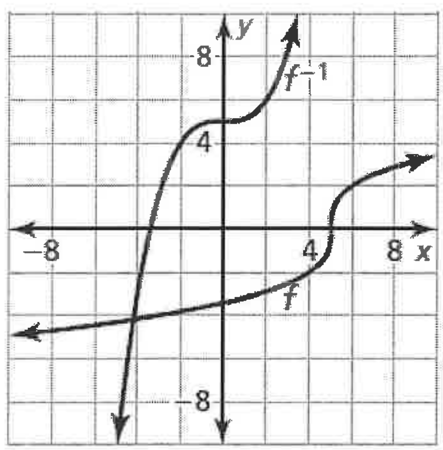
$$y = \sqrt{x + 4}$$
$$x = \sqrt{y + 4}$$
$$x^2 = y + 4$$
$$x^2 - 4 = y$$

Because the range of f is $y \geq 0$, the domain of the inverse must be restricted to $x \geq 0$. So, the inverse of f is $f^{-1}(x) = x^2 - 4$, $x \geq 0$.



35.

$$y = 2\sqrt[3]{x - 5}$$
$$x = 2\sqrt[3]{y - 5}$$
$$\frac{x}{2} = \sqrt[3]{y - 5}$$
$$\frac{x^3}{8} = y - 5$$
$$\frac{x^3}{8} + 5 = y$$

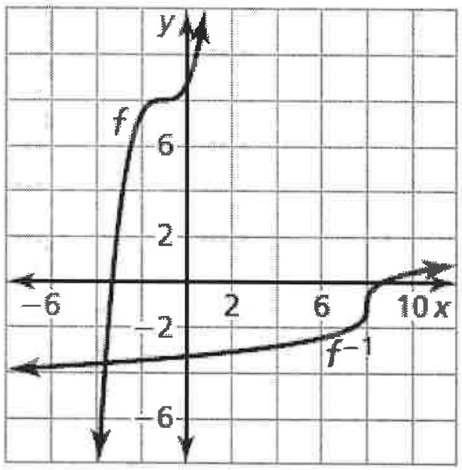


So, the inverse of f is $f^{-1}(x) = \frac{x^3}{8} + 5$.

37.

$$y = \frac{2}{3}(x + 1)^3 + 8$$
$$x = \frac{2}{3}(y + 1)^3 + 8$$
$$x - 8 = \frac{2}{3}(y + 1)^3$$
$$\frac{3}{2}x - 12 = (y + 1)^3$$
$$\sqrt[3]{\frac{3}{2}x - 12} = y + 1$$
$$\sqrt[3]{\frac{3}{2}x - 12} - 1 = y$$

So, the inverse of f is $f^{-1}(x) = \sqrt[3]{\frac{3}{2}x - 12} - 1$.



39.

$$y = -\sqrt[3]{\frac{2x+4}{3}}$$

$$x = -\sqrt[3]{\frac{2y+4}{3}}$$

$$-x = \sqrt[3]{\frac{2y+4}{3}}$$

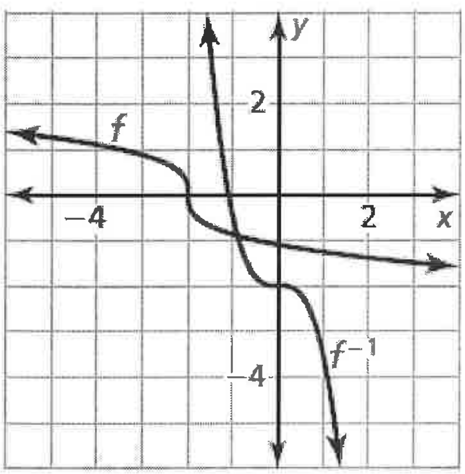
$$-x^3 = \frac{2y+4}{3}$$

$$-3x^3 = 2y + 4$$

$$-3x^3 - 4 = 2y$$

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

So, the inverse of f is $f^{-1}(x) = \dfrac{-3x^3 - 4}{2}$.



41. C; The inverse operations are in the reverse order.

43. Step 1 Show that $f(g(x)) = x$.

$$f(g(x)) = f\left(\frac{x}{2} + 9\right)$$

$$= 2\left(\frac{x}{2} + 9\right) - 9$$

$$= x + 18 - 9$$

$$= x + 9 \ ✗$$

The functions are not inverses.

45. Step 1 Show that $f(g(x)) = x$.

$$\begin{aligned} f(g(x)) &= f(5x^5 - 9) \\ &= \sqrt[5]{\frac{(5x^5 - 9) + 9}{5}} \\ &= \sqrt[5]{\frac{5x^5 - 9 + 9}{5}} \\ &= \sqrt[5]{\frac{5x^5}{5}} \\ &= \sqrt[5]{x^5} \\ &= x \checkmark \end{aligned}$$

Step 2 Show that $g(f(x)) = x$.

$$\begin{aligned} g(f(x)) &= g\left(\sqrt[5]{\frac{x + 9}{5}}\right) \\ &= 5\left(\sqrt[5]{\frac{x + 9}{5}}\right)^5 - 9 \\ &= 5\left(\frac{x + 9}{5}\right) - 9 \\ &= x + 9 - 9 \\ &= x \checkmark \end{aligned}$$

The functions are inverses.

47. Step 1 Find the inverse of the function.

$$v = 1.34\sqrt{\ell}$$

$$\frac{v}{1.34} = \sqrt{\ell}$$

$$\left(\frac{v}{1.34}\right)^2 = \ell$$

Step 2 Evaluate the inverse when $v = 7.5$.

$$\ell = \left(\frac{7.5}{1.34}\right)^2 \approx 31.3$$

To achieve a maximum speed of 7.5 knots, the waterline length of a boat needs to be about 31.3 feet.

49. B; When you reflect the graph in the line $y = x$, you get the graph shown in B.

51. A; When you reflect the graph in the line $y = x$, you get the graph shown in A.

53. From the table, $f(x) = -2$ when $x = -1$. Because $f(-1) = -2$, $f^{-1}(-2) = -1$.