ANSWER PRESENTATION TOOL

Algebra 2 - Student Edit 5 7 - Practice 2-54 ALL EVEN ODD Show Solı

2. $y = -7x - 2$

$y + 2 = -7x$

$\frac{y + 2}{-7} = x$

Find the input when $y = -3$.

$x = \frac{-3 + 2}{-7} = \frac{-1}{-7} = \frac{1}{7}$

So, the input is $\frac{1}{7}$ when the output is -3.

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

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

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

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

Find the input when $y = -3$.

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

$= -\frac{3}{2}(-4)$

$= 6$

So, the input is 6 when the output is -3.

6.

$$y = 2x^4 - 5$$

$$y + 5 = 2x^4$$

$$\frac{y+5}{2} = x^4$$

$$\pm\sqrt[4]{\frac{y+5}{2}} = x$$

Find the input when $y = -3$.

$$x = \pm\sqrt{\frac{-3+5}{2}}$$

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

$$= \pm\sqrt{1}$$

$$= \pm 1$$

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

8.

$$y = (x-5)^3 - 1$$

$$y + 1 = (x-5)^3$$

$$\sqrt[3]{y+1} = x - 5$$

$$\sqrt[3]{y+1} + 5 = x$$

Find the input when $y = -3$.

$$x = \sqrt[3]{-3+1} + 5$$

$$= \sqrt[3]{-2} + 5$$

So, the input is $\sqrt[3]{-2} + 5$ when the output is -3.

10. Method 1 Use inverse operations in reverse order.

$f(x) = -3x$

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

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

The inverse of f is $f^{-1}(x) = -\frac{1}{3}x$.

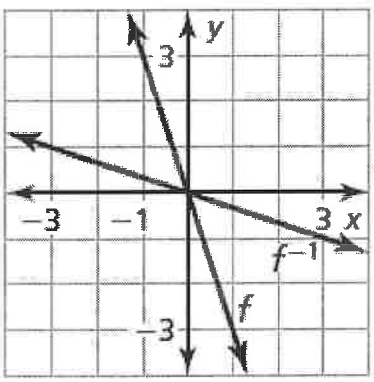
Method 2 Set y equal to $f(x)$. Switch the roles of x and y and solve for y.

$y = -3x$

$x = -3y$

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

The inverse of f is $f^{-1}(x) = -\frac{1}{3}x$.



12. Method 1 Use inverse operations in reverse order.

$f(x) = 6x - 3$

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

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

The inverse of f is $g(x) = \frac{1}{6}(x + 3)$ or $f^{-1}(x) = \frac{x + 3}{6}$.

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

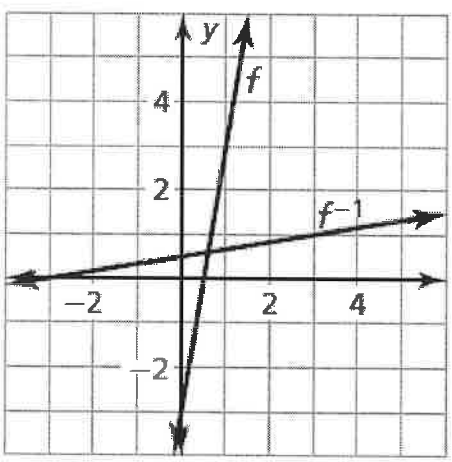
$$y = 6x - 3$$

$$x = 6y - 3$$

$$x + 3 = 6y$$

$$\frac{x + 3}{6} = y$$

The inverse of f is $f^{-1}(x) = \frac{x + 3}{6}$.



14. Method 1 Use inverse operations in reverse order.

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

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

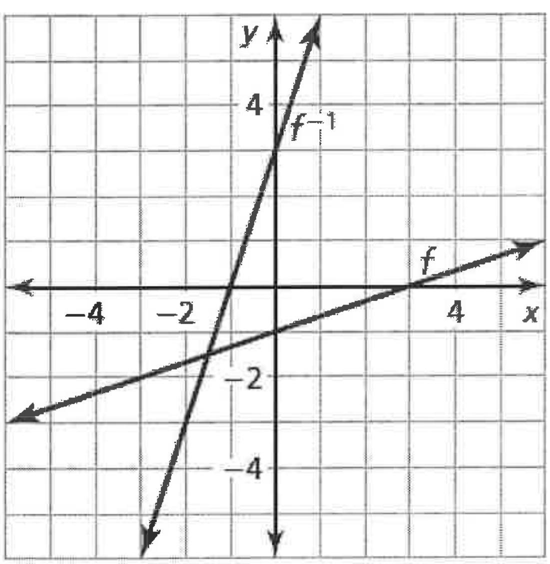
$f^{-1}(x) = 3(x + 1)$

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

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

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

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



16. Method 1 Use inverse operations in reverse order.

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

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

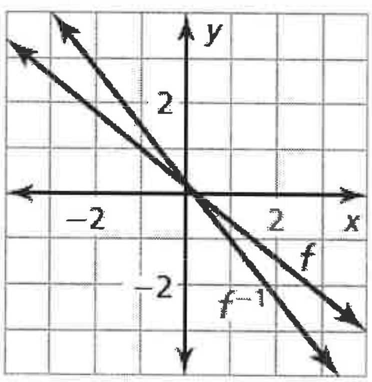
$f^{-1}(x) = -\frac{5}{4}\left(x - \frac{1}{5}\right)$

The inverse of f is $g(x) = -\frac{5}{4}\left(x - \frac{1}{5}\right)$, or $f^{-1}(x) = -\frac{5}{4}x + \frac{1}{4}$.

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

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

The inverse of f is $g(x) = -\frac{5}{4}\left(x - \frac{1}{5}\right)$, or $f^{-1}(x) = -\frac{5}{4}x + \frac{1}{4}$.



18. The functions are not inverses because the coordinates did not switch roles.

20. $f(x) = 9x^2, x \leq 0$

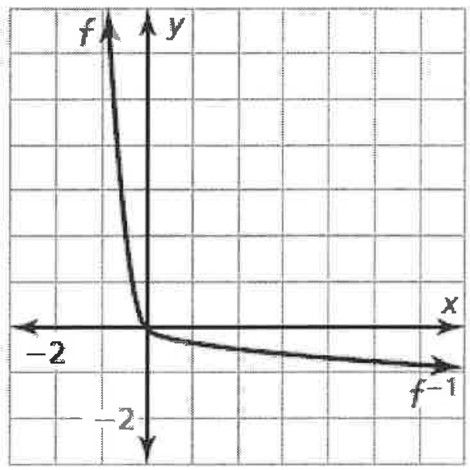
$$y = 9x^2$$

$$x = 9y^2$$

$$\frac{x}{9} = y^2$$

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

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 $f^{-1}(x) = -\frac{\sqrt{x}}{3}$.



22. $f(x) = (x + 4)^2,\ x \geq -4$

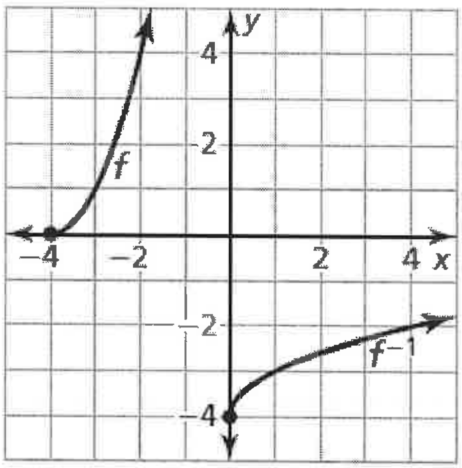
$$y = (x + 4)^2$$

$$x = (y + 4)^2$$

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

$$-4 \pm \sqrt{x} = y$$

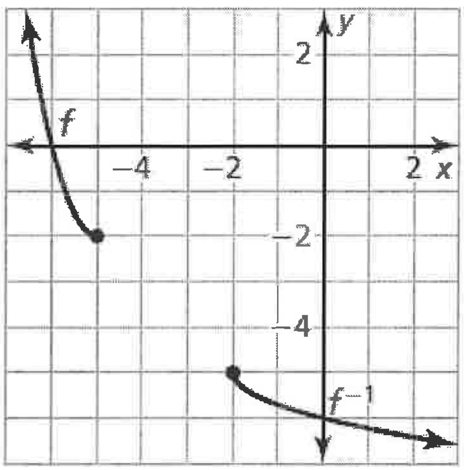
The domain of f is restricted to values greater than or equal to -4. So, the range of the inverse must also be restricted to values greater than or equal to -4. So, the inverse of f is $f^{-1}(x) = \sqrt{x} - 4$.



24.
$$f(x) = 2(x+5)^2 - 2,\ x \le -5$$
$$y = 2(x+5)^2 - 2$$
$$x = 2(y+5)^2 - 2$$
$$x + 2 = 2(y+5)^2$$
$$\frac{x}{2} + 1 = (y+5)^2$$
$$\pm\sqrt{\frac{x}{2}+1} = y + 5$$
$$-5 \pm \sqrt{\frac{x}{2}+1} = y$$

The domain of f is restricted to values less than or equal to -5. So, the range of the inverse must also be restricted to values less than or equal to -5. So, the inverse of f is

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



26. The inverse should only be $y = \sqrt{7x}$ because the domain of f is $x \ge 0$.

$$f(x) = \tfrac{1}{7}x^2,\quad x > 0$$
$$y = \tfrac{1}{7}x^2$$
$$x = \tfrac{1}{7}y^2$$
$$7x = y^2$$
$$\sqrt{7x} = y$$

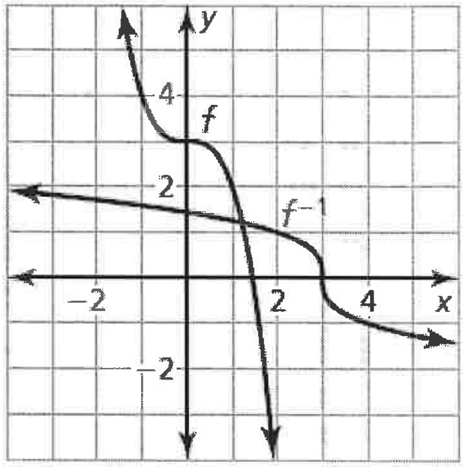
So, $f^{-1}(x) = \sqrt{7x}$.

28. f does have an inverse function because the graph of f passes the horizontal line test.

30.

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

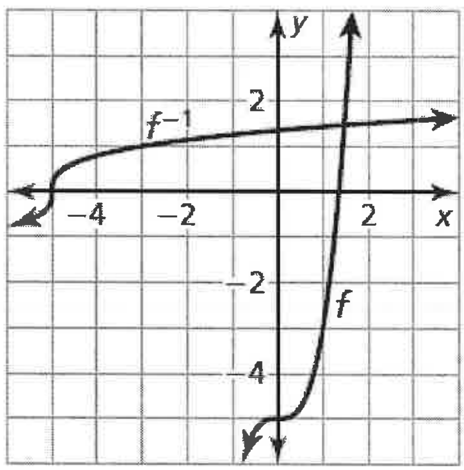
So, the inverse of f is $f^{-1}(x) = \sqrt[3]{-x + 3}$.



32.

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

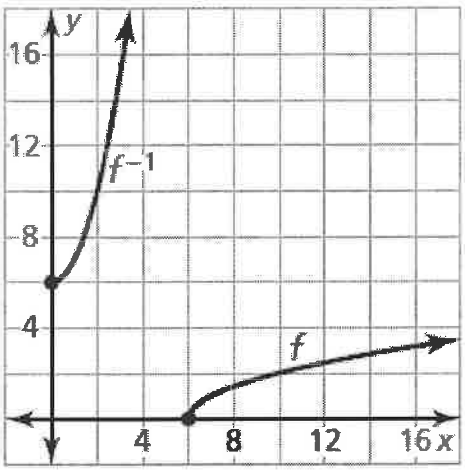
So, the inverse of f is $f^{-1}(x) = \sqrt[3]{\frac{x + 5}{2}}$.



34.

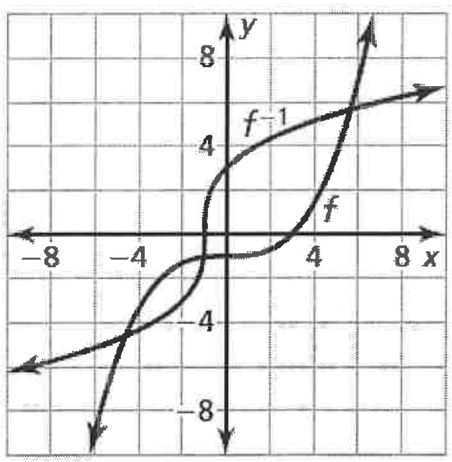
$$y = \sqrt{x - 6}$$
$$x = \sqrt{y - 6}$$
$$x^2 = y - 6$$
$$x^2 + 6 = y$$

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 $f^{-1}(x) = x^2 + 6, x \geq 0$.



36.

$$y = 3\sqrt[3]{x + 1}$$
$$x = 3\sqrt[3]{y + 1}$$
$$\frac{x}{3} = \sqrt[3]{y + 1}$$
$$\left(\frac{x}{3}\right)^3 = y + 1$$
$$\frac{x^3}{27} - 1 = y$$



So, the inverse of f is $f^{-1}(x) = \dfrac{x^3}{27} - 1$.

38.

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

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

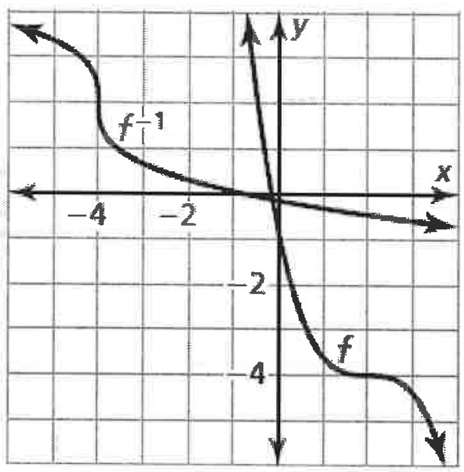
$$x + 4 = -\frac{2}{5}(y - 2)^3$$

$$-\frac{5}{2}x - 10 = (y - 2)^3$$

$$\sqrt[3]{-\frac{5}{2}x - 10} = y - 2$$

$$\sqrt[3]{-\frac{5}{2}x - 10} + 2 = y$$

So, the inverse of f is $f^{-1}(x) = \sqrt[3]{-\frac{5}{2}x - 10} + 2$.



40.

$$y = -3\sqrt{\frac{4x-7}{3}}$$

$$x = -3\sqrt{\frac{4y-7}{3}}$$

$$\frac{x}{-3} = \sqrt{\frac{4y-7}{3}}$$

$$\left(\frac{x}{-3}\right)^2 = \frac{4y-7}{3}$$

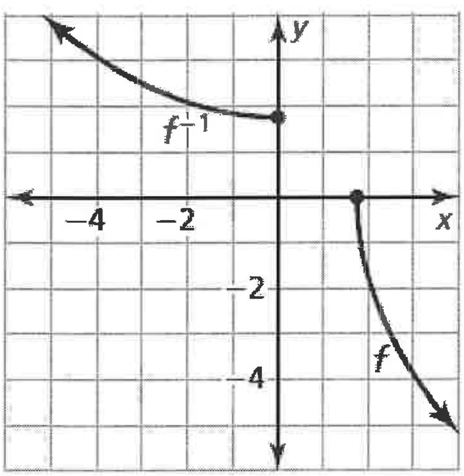
$$3\left(\frac{x^2}{9}\right) = 4y - 7$$

$$\frac{x^2}{3} + 7 = 4y$$

$$\frac{x^2}{12} + \frac{7}{4} = y$$

$$\frac{x^2+21}{12} = y$$

Because the range of f is $y \leq 0$, the domain of the inverse must be restricted to $x \leq 0$. So, the inverse of f is $f^{-1}(x) = \frac{x^2+21}{12}, x \leq 0$.



42. B; The function has a reciprocal slope and the y-intercept is the same as the x-intercept of the graph.

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

$$f(g(x)) = f(5x + 1)$$
$$= \frac{(5x + 1) - 1}{5}$$
$$= \frac{5x}{5}$$
$$= x \checkmark$$

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

$$g(f(x)) = g\left(\frac{x - 1}{5}\right)$$
$$= 5\left(\frac{x - 1}{5}\right) + 1$$
$$= x - 1 + 1$$
$$= x \checkmark$$

The functions are inverses.

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

$$f(g(x)) = f\left(\left(\frac{x + 4}{7}\right)^{3/2}\right)$$
$$= 7\left[\left(\frac{x + 4}{7}\right)^{3/2}\right]^{3/2} - 4$$
$$= 7\left(\frac{x + 4}{7}\right)^{9/2} - 4 \text{ ✗}$$

The functions are not inverses.

48. Step 1 Find the inverse of the function.

$$R = \frac{3}{8}L - 5$$

$$R + 5 = \frac{3}{8}L$$

$$\frac{8}{3}(R + 5) = L$$

Step 2 Evaluate the inverse when $R = 19$.

$$L = \frac{8}{3}(19 + 5)$$

$$= \frac{8}{3}(24)$$

$$= 64$$

The stretched band provides 19 pounds of resistance at a length of 64 inches.

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

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

54. From the graph, $f(x) = -2$ when $x = -4$. Because $f(-4) = -2$, $f^{-1}(-2) = -4$.