ANSWER PRESENTATION TOOL

Algebra 2 - Student Edit 5 Chapter Rev 1-49 ALL EVEN Show Solu

ODD

1. Because $n = 4$ is even and $a = 1296 > 0$, 1296 has two real fourth roots. Because $6^4 = 1296$ and $(-6)^4 = 1296$, you can write $\pm\sqrt[4]{1296} = \pm 6$ or $\pm 1296^{1/4} = \pm 6$.

3. $8^{7/3} = (8^{1/3})^7 = 2^7 = 128$

5. $(-27)^{-2/3} = \left[(-27)^{1/3}\right]^{-2} = (-3)^{-2} = \frac{1}{(-3)^2} = \frac{1}{9}$

7. $7x^3 = 189$

$x^3 = 27$

$x = 3$

The solution is $x = 3$.

9. The graph of $y = 3x$ is an increasing function for all x.

$3^{1.45} < 3^{1.5}$

$3^{1.45} < 3^{3/2}$

$3^{1.45} < \sqrt{3^3}$

$3^{1.45} < \sqrt{27}$

$\sqrt{27} < \sqrt{36}$

$\sqrt{27} < 6$

$3^{1.45} < \sqrt{27}$ and $\sqrt{27} < 6$

So, $3^{1.45} < 6$.

11. $\left(\frac{6^{2/5}}{6^{1/5}}\right)^3 = (6^{2/5 - 1/5})^3 = (6^{1/5})^3 = 6^{3/5}$

13. $\frac{1}{2 - \sqrt{7}} = \frac{1}{2 - \sqrt{7}} \cdot \frac{2 + \sqrt{7}}{2 + \sqrt{7}}$

$= \frac{2 + \sqrt{7}}{4 - 7}$

$= \frac{2 + \sqrt{7}}{-3}$

$= -\frac{2 + \sqrt{7}}{3}$

15. $2\sqrt{48} - \sqrt{3} = 2\sqrt{16 \cdot 3} - \sqrt{3}$

$= 2\sqrt{16} \cdot \sqrt{3} - \sqrt{3}$

$= 2 \cdot 4 \cdot \sqrt{3} - \sqrt{3}$

$= 8\sqrt{3} - \sqrt{3}$

$= 7\sqrt{3}$

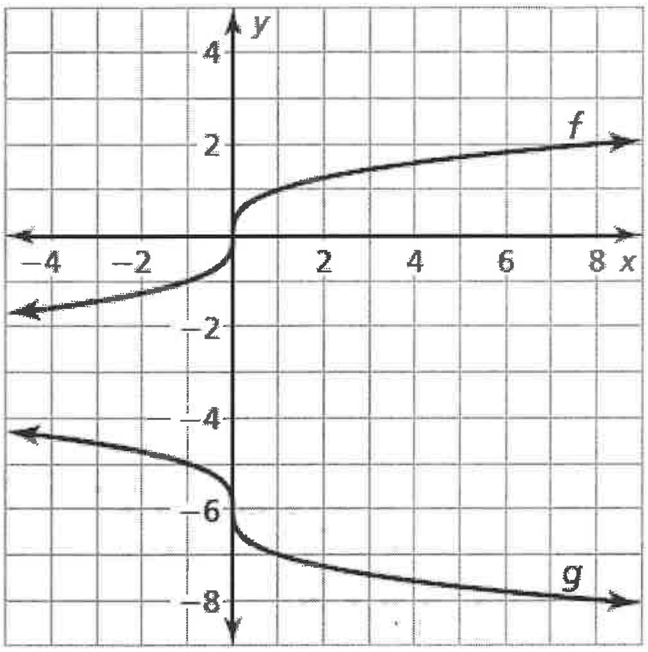
17. $\sqrt[3]{125z^9} = \sqrt[3]{125} \cdot \sqrt[3]{z^9} = 5z^3$

19. $\sqrt{10z^5} - z^2\sqrt{40z} = z^2\sqrt{10z} - 2z^2\sqrt{10z}$

$= (z^2 - 2z^2)\sqrt{10z}$

$= -z^2\sqrt{10z}$

21. The graph of g is a reflection in the y-axis and a translation 6 units down of the graph of f.

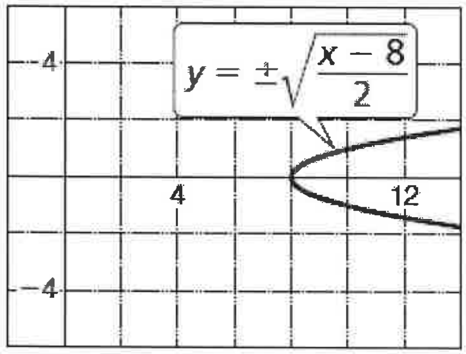


23. Step 1 Solve for y.

$$2y^2 = x - 8$$
$$y^2 = \frac{1}{2}x - 4$$
$$y = \pm\sqrt{\frac{1}{2}x - 4}$$

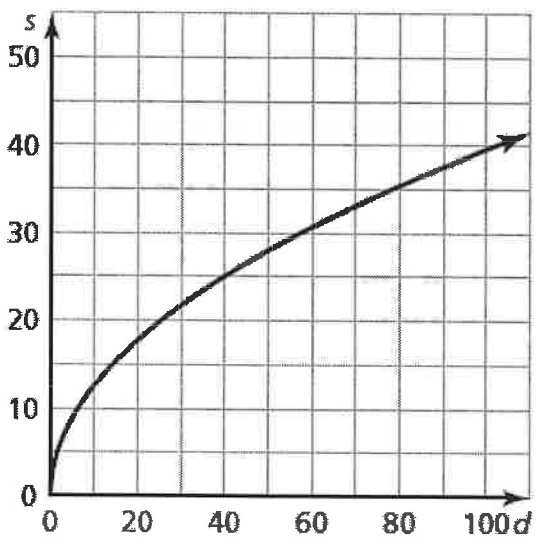
Step 2 Graph both radical functions.

$$y_1 = \sqrt{\frac{1}{2}x - 4}$$
$$y_2 = -\sqrt{\frac{1}{2}x - 4}$$



The vertex is (8, 0) and the parabola opens right.

25.



Find the speed of the car when $d = 90$.

$s = 4\sqrt{90} \approx 38$

So, when the skid mark is 90 feet, the speed of the car was about 38 miles per hour. Therefore, the car was going faster than the posted speed limit of 35 miles per hour.

27.

$$\sqrt{4x-4} = \sqrt{5x-1} - 1$$
$$\left(\sqrt{4x-4}\right)^2 = \left(\sqrt{5x-1} - 1\right)^2$$
$$4x - 4 = \left(\sqrt{5x-1}\right)^2 - 2\sqrt{5x-1} + 1$$
$$4x - 4 = 5x - 1 - 2\sqrt{5x-1} + 1$$
$$-x - 4 = -2\sqrt{5x-1}$$
$$x + 4 = 2\sqrt{5x-1}$$
$$(x+4)^2 = \left(2\sqrt{5x-1}\right)^2$$
$$x^2 + 8x + 16 = 4(5x-1)$$
$$x^2 + 8x + 16 = 20x - 4$$
$$x^2 - 12x + 20 = 0$$
$$(x-10)(x-2) = 0$$
$$x - 10 = 0 \quad \text{or} \quad x - 2 = 0$$
$$x = 10 \quad \text{or} \quad x = 2$$

Check:

$$\sqrt{4(10) - 4} \stackrel{?}{=} \sqrt{5(10) - 1} - 1$$
$$\sqrt{36} \stackrel{?}{=} \sqrt{49} - 1$$
$$6 \stackrel{?}{=} 7 - 1$$
$$6 = 6 \checkmark$$

$$\sqrt{4(2) - 4} \stackrel{?}{=} \sqrt{5(2) - 1} - 1$$
$$\sqrt{4} \stackrel{?}{=} \sqrt{9} - 1$$
$$2 \stackrel{?}{=} 3 - 1$$
$$2 = 2 \checkmark$$

The solutions are $x = 10$ and $x = 2$.

29. Step 1 Solve for x.

$$5\sqrt{x} + 2 > 17$$
$$5\sqrt{x} > 15$$
$$\sqrt{x} > 3$$
$$x > 9$$

Step 2 Consider the radicand.

$$x \geq 0$$

So, the solution is $x > 9$.

31. Step 1 Solve for x.

$$7\sqrt[3]{x-3} \geq 21$$
$$\sqrt[3]{x-3} \geq 3$$
$$x - 3 \geq 27$$
$$x \geq 30$$

Step 2 Consider the radicand.

$$x - 3 \geq 0$$
$$x \geq 3$$

So, the solution is $x \geq 30$.

33. $(fg)(x) = f(x)g(x) = \left(2\sqrt{3-x}\right)\left(4\sqrt[3]{3-x}\right) = 8(3-x)^{5/6}$

The function f has the domain $x \le 3$ and g has the domain of all real numbers. So, the domain of fg is $x \le 3$. When $x = 2$, the value of the product is

$(fg)(2) = 8(3-2)^{5/6} = 8(1)^{5/6} = 8(1) = 8.$

$\left(\frac{f}{g}\right)(x) = \frac{2\sqrt{3-x}}{4\sqrt[3]{3-x}} = \frac{1}{2}(3-x)^{1/6}$

The function f has the domain $x \le 3$ and g has the domain of all real numbers. So, the domain of $\frac{f}{g}$ is $x < 3$.

When $x = 2$, the value of the quotient is

$\left(\frac{f}{g}\right)(2) = \frac{1}{2}(3-2)^{1/6} = \frac{1}{2}(1) = \frac{1}{2}.$

35. sometimes true; If the leading coefficients of f and g are opposites when $f + g$ will be a linear function.

37. $f(h(11)) = f\left(\sqrt{11-7}\right) = f\left(\sqrt{4}\right) = f(2) = 2 + 3 = 5$

39. $h(g(2)) = h(4(2)^2) = h(16) = \sqrt{16-7} = \sqrt{9} = 3$

41. $h(f(x)) = h(2x-5)$

$= 3(2x-5) + 4$

$= 6x - 15 + 4$

$= 6x - 11$

The domain is all real numbers.

43. a radical function; Let $f(x) = \sqrt{x}$ and $g(x) = ax$.

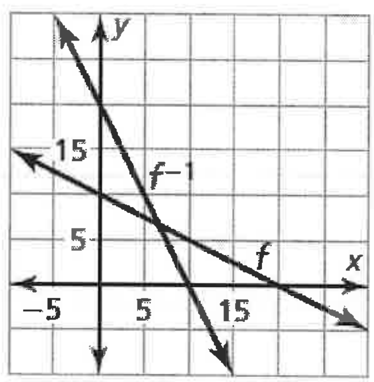
$f(g(x)) = f(ax) = \sqrt{ax}$

So, the composition of a radical function and a linear function is a radical function.

45.

$$f(x) = -\frac{1}{2}x + 10$$
$$y = -\frac{1}{2}x + 10$$
$$x = -\frac{1}{2}y + 10$$
$$x - 10 = -\frac{1}{2}y$$
$$-2(x - 10) = y$$

The inverse of f is $g(x) = -2(x - 10)$, or $f^{-1}(x) = -2x + 20$.



47. $f(x) = -x^3 - 9$

$$y = -x^3 - 9$$

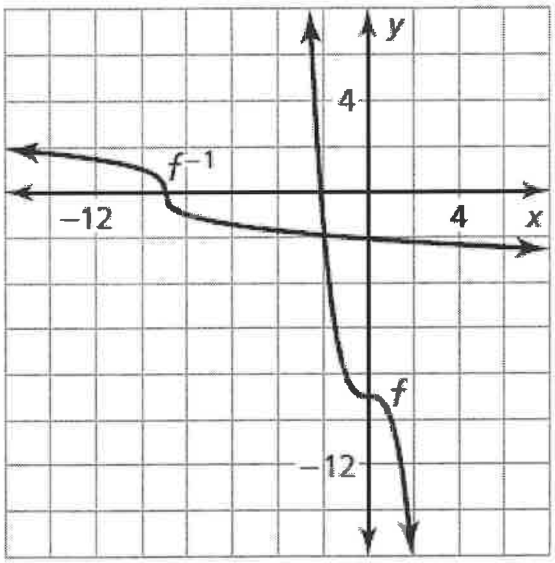
$$x = -y^3 - 9$$

$$x + 9 = -y^3$$

$$-x - 9 = y^3$$

$$\sqrt[3]{-x - 9} = y$$

The inverse of f is $f^{-1}(x) = \sqrt[3]{-x - 9}$.



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

$$f(g(x)) = f\left(\tfrac{1}{4}(x + 11)^2\right)$$

$$= 4\left(\tfrac{1}{4}(x + 11)^2 - 11\right)^2$$

$$\neq x$$

So, the functions are not inverses.