ANSWER PRESENTATION TOOL

2. Because $n = 5$ is odd and $a = -1024 < 0$, -1024 has one real fifth root. Because $(-4)^5 = -1024$, you can write $\sqrt[5]{-1024} = -4$ or $(-1024)^{1/4} = -4$.

4. $9^{5/2} = (9^{1/2})^5 = 3^5 = 243$

6. $x^5 + 17 = 35$

$x^5 = 18$

$x \approx 1.78$

The solution is $x \approx 1.78$.

8. $(x + 8)^4 = 16$

$x + 8 = \pm 2$

$x = -8 \pm 2$

The solutions are $x = -10$ and $x = -6$.

10. Substitute 161 for V in the equation and solve for s.

$161 = 0.47s^3$

$342.6 \approx s^3$

$s \approx 7$

When the volume of the octahedron is 161 cubic millimeters, the side length is about 7 millimeters.

12. $\sqrt[4]{32} \cdot \sqrt[4]{8} = \sqrt[4]{32 \cdot 8} = \sqrt[4]{256} = 4$

14. $4\sqrt[5]{8} + 3\sqrt[5]{8} = 7\sqrt[5]{8}$

16. $(5^{2/3} \cdot 2^{3/2})^{1/2} = (5^{2/3})^{1/2} \cdot (2^{3/2})^{1/2}$

$= 5^{2/6} \cdot 2^{3/4}$

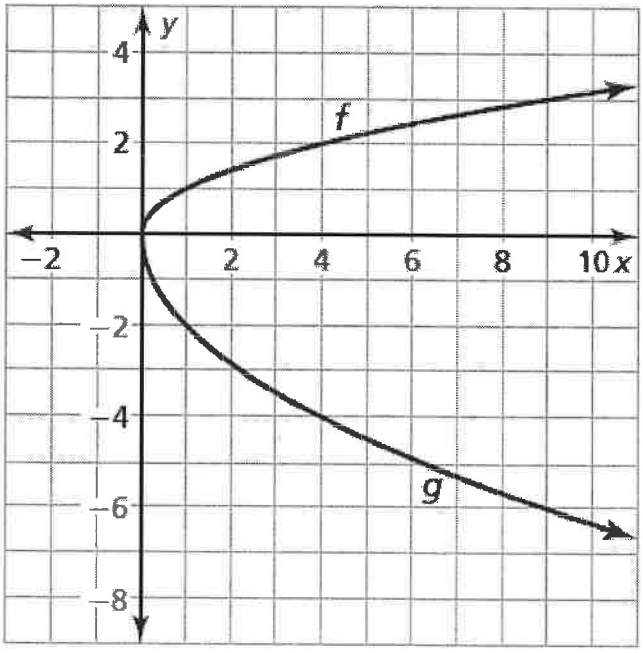
$= 5^{1/3} \cdot 2^{3/4}$

18. $\frac{2^{1/4}z^{5/4}}{6z} = \frac{2^{1/4}z^{5/4-1}}{6}$

$= \frac{2^{1/4}z^{1/4}}{6}$

$= \frac{(2z)^{1/4}}{6}$

20. The graph of g is a vertical stretch by a factor of 2 followed by a reflection in the x-axis of the graph of f.



22. Step 1 First write a function h that represents the reflection of f.

$$h(x) = f(-x)$$
$$= \sqrt[3]{-x}$$

Step 2 Then write a function g that represents the translation of h.

$$g(x) = h(x - 7)$$
$$= \sqrt[3]{-(x - 7)}$$
$$= \sqrt[3]{-x + 7}$$

The transformed function is $g(x) = \sqrt[3]{-x + 7}$.

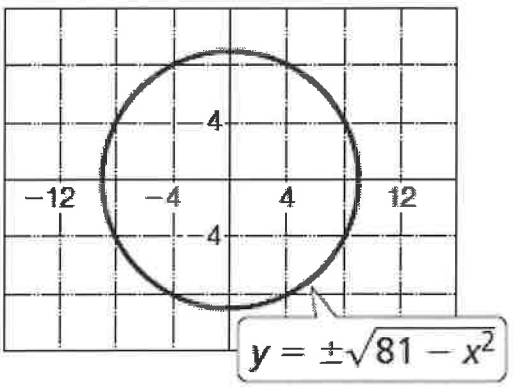
24. Step 1 Solve for y.

$$x^2 + y^2 = 81$$
$$y^2 = 81 - x^2$$
$$y = \pm\sqrt{81 - x^2}$$

Step 2 Graph both radical functions using a square viewing window.

$$y_1 = \sqrt{81 - x^2}$$

$$y_2 = -\sqrt{81 - x^2}$$



The radius is 9 units. The x-intercepts are ± 9. The y-intercepts are ± 9.

26. $4\sqrt[3]{2x+1} = 20$

$\sqrt[3]{2x+1} = 5$

$\left(\sqrt[3]{2x+1}\right)^3 = 5^3$

$2x + 1 = 125$

$2x = 124$

$x = 62$

Check:

$4\sqrt[3]{2(62)+1} \stackrel{?}{=} 20$

$4\sqrt[3]{125} \stackrel{?}{=} 20$

$4 \cdot 5 \stackrel{?}{=} 20$

$20 = 20$

The solution is $x = 62$.

28. $(6x)^{2/3} = 36$

$\left[(6x)^{2/3}\right]^{3/2} = 36^{3/2}$

$6x = \pm 216$

$x = \pm 36$

Check:

$(6 \cdot 36)^{2/3} \stackrel{?}{=} 36$

$(216)^{2/3} \stackrel{?}{=} 36$

$36 = 36$ ✓

$[6 \cdot (-36)]^{2/3} \stackrel{?}{=} 36$

$(-216)^{2/3} \stackrel{?}{=} 36$

$36 = 36$ ✓

The solutions are $x = -36$ and $x = 36$.

30. Step 1 Solve for x.

$$2\sqrt{x-8} < 24$$
$$\sqrt{x-8} < 12$$
$$x - 8 < 144$$
$$x < 152$$

Step 2 Consider the radicand.

$$x - 8 \geq 0$$
$$x \geq 8$$

So, the solution is $8 \leq x < 152$.

32.
$$s(d) = \sqrt{9.8d}$$
$$200 = \sqrt{9.8d}$$
$$40{,}000 = 9.8d$$
$$4082 \approx d$$

The depth of the water is about 4082 meters.

34. $(f + g)(x) = f(x) + g(x) = (3x^2 + 1) + (x + 4)$
$= 3x^2 + x + 5$

The functions f and g each have the same domain: all real numbers. So, the domain of $f + g$ is of all real numbers. When $x = -5$, the value of the sum is

$(f + g)(-5) = 3(-5)^2 + (-5) + 5 = 75.$

$(f - g)(x) = f(x) - g(x) = (3x^2 + 1) - (x + 4) = 3x^2 - x - 3$

The functions f and g each have the same domain: all real numbers. So, the domain of $f - g$ is of all real numbers. When $x = -5$, the value of the difference is

$(f - g)(-5) = 3(-5)^2 - (-5) - 3 = 77.$

36. always true; $(fg)(a) = f(a)g(a) = 3(4) = 12$

38. $g(f(-8)) = g(-8 + 3) = g(-5) = 4(-5)^2 = 100$

40. $f(g(x)) = f(x^{-2}) = 2(x^{-2}) - 5 = \frac{2}{x^2} - 5$

The domain is all real numbers except $x = 0$.

42. $g(h(x)) = g(3x + 4) = (3x + 4)^{-2} = \frac{1}{(3x + 4)^2}$

The domain is all real numbers except $x = -\frac{4}{3}$.

44. *Sample answer:* Let x represent the price of the entire purchase. Let $d(x) = x - 15$ represent the total purchase price after the \$15 off coupon. Let $p(x) = x - 0.1x = 0.9x$ be the total purchase price after the 10% off coupon.

Applying the \$15 off coupon first is represented by $p(d(x))$.

$p(d(x)) = p(x - 15) = 0.9(x - 15) = 0.9x - 13.5$

Applying the 10% off coupon first is represented by $d(p(x))$.

$d(p(x)) = d(0.9x) = 0.9x - 15$

Compare $0.9x - 15 < 0.9x - 13.5$

$-15 < -13.5$

Since $d(p(x)) < p(d(x))$, the order of discounts that results in a lesser total is 10% off followed by \$15 off.

46. $f(x) = x^2 + 8, x \geq 0$

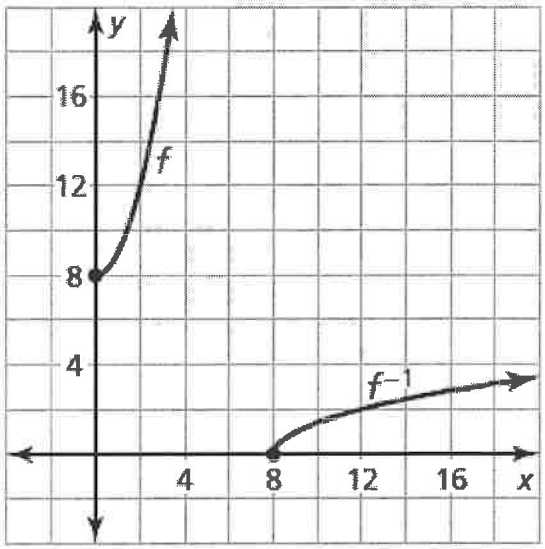
$y = x^2 + 8$

$x = y^2 + 8$

$x - 8 = y^2$

$\pm\sqrt{x - 8} = y$

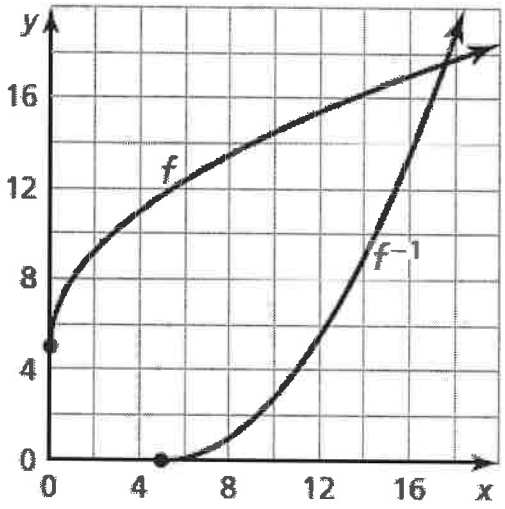
Because the domain of f is $x \geq 0$, the range of the inverse is $y \geq 0$. So, the inverse of f is $f^{-1}(x) = \sqrt{x - 8}$.



48.

$$f(x) = 3\sqrt{x} + 5$$
$$y = 3\sqrt{x} + 5$$
$$x = 3\sqrt{y} + 5$$
$$x - 5 = 3\sqrt{y}$$
$$\frac{x-5}{3} = \sqrt{y}$$
$$\left(\frac{x-5}{3}\right)^2 = y$$
$$\frac{1}{9}(x-5)^2 = y$$

Because the range of f is $y \geq 5$, the domain of g is $x \geq 5$.
So, the inverse of f is $f^{-1}(x) = \frac{1}{9}(x-5)^2, x \geq 5$.



50. yes