Sketch the Graph, then identify the Domain and Range of each.

1) \( y = \sqrt{x + 6} - 2 \)

2) \( y = (x + 3)^3 - 2 \)

3) \( y = -3 \sqrt{x + 4} + 4 \)

4) \( y = \sqrt[3]{x + 1} - 4 \)

Simplify.

5) \( (-2q^3)^4 \cdot 2m^2 p^4 q^4 \)

6) \( (-2xy^0z^3 \cdot -2xy^4z^3)^2 \)
Simplify. Your answer should contain only positive exponents.

7) \( a^2b^{-1} \cdot (-ba^{-2})^4 \)  

8) \(-yx^2 \cdot (x^4y^3)^4\)

9) \( \frac{(-x^{-2}y^2)^2}{x^2y^{-4} \cdot x^0y^2} \)

10) \( \frac{vu^4}{(-u^{-3}v^2 \cdot -v^2)^4} \)

11) \( \frac{x^{-3}y^0 \cdot yx^3}{(2x^4y^4)^3} \)

12) \( \frac{(x^3)^2}{x^4y^0 \cdot 2yx^4} \)

Write each expression in exponential form. Some WILL have negative exponents.

13) \( (\sqrt[5]{2x})^5 \)

14) \( \frac{1}{\sqrt[6]{2x^2}} \)

Write each expression in radical form.

15) \( (10a)^{\frac{7}{4}} \)

16) \( (6x)^{\frac{3}{2}} \)

Simplify.

17) \( (49n^4)^{\frac{1}{2}} \)

18) \( (x^{12})^{\frac{1}{4}} \)
19) \( (4n^4)^\frac{3}{2} \)

20) \( (8n^6)^\frac{2}{3} \)

21) \(-3\sqrt{3} + 3\sqrt{24} - 3\sqrt{12} \)

22) \(-3\sqrt{24} - 2\sqrt{6} - \sqrt{54} \)

23) \(\sqrt{21x} \cdot -6\sqrt{49x} \)

24) \(\frac{3}{30n^5} \cdot \frac{3}{150n^4} \)

25) \(-\sqrt{6}(4\sqrt{3} + 3) \)

26) \((\sqrt{2} + 4\sqrt{7})(\sqrt{8} + 6\sqrt{7}) \)

27) \(\frac{\sqrt{3}}{2\sqrt{4}} \)

28) \(\frac{5 - \sqrt{3}}{3\sqrt{5}} \)

29) \(\frac{2}{2 - 3\sqrt{7}} \)

30) \(\frac{\sqrt{3} + \sqrt{5}}{5 - \sqrt{3}} \)

Solve each equation. Remember to check for extraneous solutions.

31) \(4 = \sqrt{n} + 2 \)

32) \(18 = 6\sqrt{3x} - 6 \)

33) \(\sqrt{3n} + 6 = \sqrt{10} - n \)

34) \(\sqrt{20} - x = x \)
35) \[ x - 9 = \sqrt{63 - 7x} \]

36) \[ 512 = x^3 \]

37) \[ 6 = 2 \cdot (3n)^{\frac{1}{2}} \]

38) \[ 9 = 5 + (k + 22)^{\frac{1}{2}} \]

39) A spherical water tank holds 8000 cubic feet of water. What is the diameter of the tank rounded to the nearest hundredth?

(Hint: \[ V = \frac{\pi d^3}{6} \])

40) Police can estimate the speed of a vehicle before the brakes are applied using the formula \[ 0.75d = \frac{s^2}{30.25} \]. What was the approximate speed of a vehicle that left a skid mark measuring 120 feet? (Round your answer to the nearest hundredth.)

41) Jamie buys a square tablecloth. According to the package, the area of the cloth is 800 square inches. What is the length of a side of the tablecloth? Express your answer as a simplified radical.

42) If a ball is dropped on the ground from a height of \( h \) meters, then the velocity at which the ball hits the ground can be calculated by \[ V = \frac{9}{2} \sqrt{h} \] m/sec. If the velocity with which a ball reaches the ground is 36 m/s, from what height was the ball dropped?

43) The time period (in seconds) of a simple pendulum of length \( l \) ft. is given by \[ T = \frac{4}{5} \sqrt{2l} \]. If the time period was 8 seconds, what was the length of the pendulum?
Sketch the Graph, then identify the Domain and Range of each.

1) \( y = \sqrt{x + 6} - 2 \)

Domain: \( x \geq -6 \)
Range: \( y \geq -2 \)

2) \( y = (x + 3)^3 - 2 \)

3) \( y = -3\sqrt{x + 4} + 4 \)

Domain: \( x \geq -4 \)
Range: \( y \leq 4 \)

4) \( y = \frac{3}{\sqrt{x + 1}} - 4 \)

Simplify.

5) \( (-2q^3)^4 \cdot 2m^2 p^4 q^4 \)
\[ = 32q^{16} m^2 p^4 \]

6) \( (-2xy^0 z^3 \cdot -2xy^4 z^3)^2 \)
\[ = 16x^4 z^{12} y^8 \]
Simplify. Your answer should contain only positive exponents.

7) \(a^2b^{-1} \cdot (-ba^{-2})^4\)

\(\frac{b^3}{a^6}\)

8) \(-yx^2 \cdot (x^4y^3)^4\)

\(-y^{13}x^{18}\)

9) \(\frac{(-x^{-2}y^2)^2}{x^2y^{-4} \cdot -x^0y^2}\)

\(-\frac{y^6}{x^6}\)

10) \(\frac{vu^4}{(-u^{-3}v^2 \cdot -v)^4}\)

\(\frac{u^{16}}{v^{15}}\)

11) \(\frac{x^{-3}y^0 \cdot yx^3}{(2x^4y^4)^{-3}}\)

\(8x^{12}y^{13}\)

12) \(\frac{(x^3)^2}{x^4y^0 \cdot 2yx^4}\)

\(\frac{1}{2x^2y}\)

Write each expression in exponential form. Some WILL have negative exponents.

13) \((\sqrt[5]{2x})^5\)

\((2x)^\frac{5}{3}\)

14) \(\frac{1}{\sqrt[6]{2x^2}}\)

\((2x^2)^{-\frac{1}{6}}\)

Write each expression in radical form.

15) \((10a)^\frac{7}{4}\)

\((\sqrt[7]{10a})^\frac{4}{7}\)

16) \((6x)^{\frac{3}{2}}\)

\(\frac{1}{(\sqrt[3]{6x})^3}\)

Simplify.

17) \((49n^4)^{\frac{1}{2}}\)

\(7n^2\)

18) \((x^{12})^{\frac{1}{4}}\)

\(\frac{1}{x^3}\)
19) \((4n^4)^\frac{3}{2}\)
\[8n^6\]

20) \((8n^6)^\frac{2}{3}\)
\[4n^4\]

21) \(-3\sqrt{3} + 3\sqrt{24} - 3\sqrt{12}\)
\[-9\sqrt{3} + 6\sqrt{6}\]

22) \(-3\sqrt{24} - 2\sqrt{6} - \sqrt{54}\)
\[-11\sqrt{6}\]

23) \(\sqrt{21x} \cdot -6\sqrt{49x}\)
\[-42x\sqrt{21}\]

24) \(\frac{3}{\sqrt{30n^3}} \cdot \frac{3}{\sqrt{150n^4}}\)
\[5n^2\frac{3\sqrt{36n}}{36n}\]

25) \(-\sqrt{6}(4\sqrt{3} + 3)\)
\[-12\sqrt{2} - 3\sqrt{6}\]

26) \((\sqrt{2} + 4\sqrt{7})(\sqrt{8} + 6\sqrt{7})\)
\[172 + 14\sqrt{14}\]

27) \(\frac{\sqrt{3}}{2\sqrt{4}}\)
\[\frac{\sqrt{3}}{4}\]

28) \(\frac{5 - \sqrt{3}}{3\sqrt{5}}\)
\[\frac{5\sqrt{5} - \sqrt{15}}{15}\]

29) \(\frac{2}{2 - 3\sqrt{7}}\)
\[\frac{-4 - 6\sqrt{7}}{59}\]

30) \(\frac{\sqrt{3} + \sqrt{5}}{5 - \sqrt{3}}\)
\[\frac{5\sqrt{3} + 3 + 5\sqrt{5} + \sqrt{15}}{22}\]

Solve each equation. Remember to check for extraneous solutions.

31) \(4 = \sqrt{n} + 2\)
\[14\]

32) \(18 = 6\sqrt{3x} - 6\)
\[5\]

33) \(\sqrt{3n} + 6 = \sqrt{10} - n\)
\[1\]

34) \(\sqrt{20} - x = x\)
\[4\]
35) \( x - 9 = \sqrt{63 - 7x} \)  
\[9\]  
36) \( 512 = x^3 \)  
\[64\]  
37) \( 6 = 2 \cdot (3n)^{\frac{1}{2}} \)  
\[3\]  
38) \( 9 = 5 + (k + 22)^{\frac{1}{2}} \)  
\[\{-6\}\]  

39) A spherical water tank holds 8000 cubic feet of water. What is the diameter of the tank rounded to the nearest hundredth?  
(Hint: \( V = \frac{\pi}{6} d^3 \))  
24.81 ft.  

40) Police can estimate the speed of a vehicle before the brakes are applied using the formula \( 0.75d = \frac{s^2}{30.25} \). What was the approximate speed of a vehicle that left a skid mark measuring 120 feet? (Round your answer to the nearest hundredth.)  
52.18 mph.  

41) Jamie buys a square tablecloth. According to the package, the area of the cloth is 800 square inches. What is the length of a side of the tablecloth? Express your answer as a simplified radical.  
\(20\sqrt{2}\) inches  

42) If a ball is dropped on the ground from a height of \( h \) meters, then the velocity at which the ball hits the ground can be calculated by \( V = \frac{9}{2} \sqrt{h} \) m/sec. If the velocity with which a ball reaches the ground is 36 m/s, from what height was the ball dropped?  
64 meters  

43) The time period (in seconds) of a simple pendulum of length \( l \) ft. is given by \( T = \frac{4}{5} \sqrt{2l} \). If the time period was 8 seconds, what was the length of the pendulum?  
50 ft.