Honors Math 2 Name Key
Unit 3.3 WS graphing square & cube roots Period________Date________

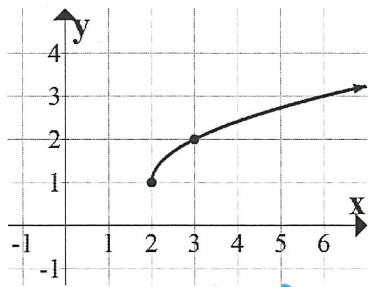
1. Complete this statement: Square roots functions and cube root functions are examples of Radical functions.

2. Explain why the graph shown at the near right is not the graph of $y = \sqrt{x-1} + 2$.

V: (1,2)

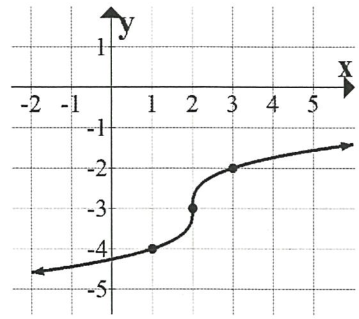
3. Explain why the graph shown at the far right in not the graph of $y = \sqrt[3]{x+2} - 3$.

V: (-2,-3)



V: (2,1)

Problem 2



Problem 3

V: (2,-3)

Describe how to obtain the graph of $g(x)$ from the graph of $f(x)$.

4. $g(x) = \sqrt{x+5}$, $f(x) = \sqrt{x}$

left 5

5. $g(x) = \sqrt[3]{x} - 10$, $f(x) = \sqrt[3]{x}$

down 10

6. Biologists have discovered that the shoulder height h (in centimeters) of a male African elephant can be modeled by $h(t) = 62.5\sqrt[3]{t} + 75.8$. Use a graphing calculator to graph the model. Then use the graph to estimate the age of an elephant whose shoulder height is 250 centimeters.

21.7 yrs.

Describe how to obtain the graph of $g(x)$ from the graph of $f(x)$.

7. $g(x) = \sqrt{x+14}$, $f(x) = \sqrt{x}$

left 14

8. $g(x) = 5\sqrt{x-10} - 3$, $f(x) = 5\sqrt{x}$

Right 10, down 3

9. $g(x) = -\sqrt[3]{x} - 10$, $f(x) = -\sqrt[3]{x}$

down 10

10. $g(x) = \sqrt[3]{x+6} - 5$, $f(x) = \sqrt[3]{x}$

left 6, down 5

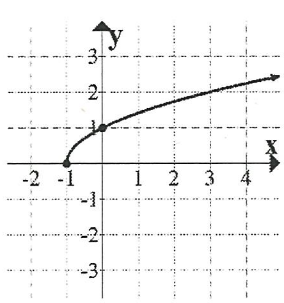
Match the function with its graph.

11. $y = \sqrt{x} - 1$ B

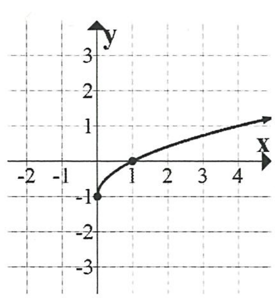
12. $y = \sqrt{x+1}$ A

13. $y = \sqrt{x+1} - 1$ C

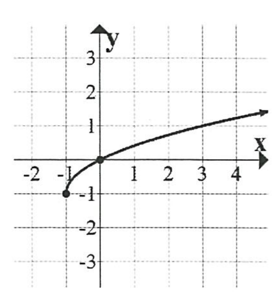
A.



B.



C.

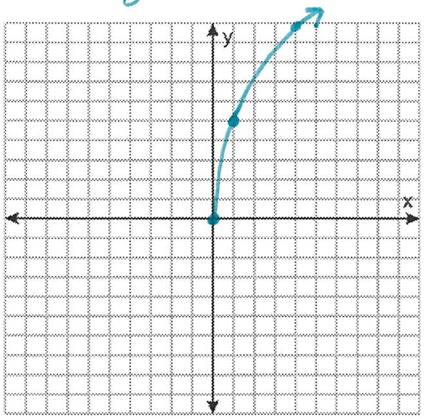


Graph the function. State the domain and range.

14. $y = 5\sqrt{x}$

Domain: $x \geq 0$

Range: $y \geq 0$

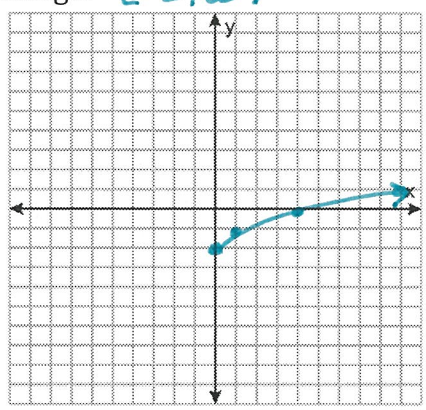


15. $y = x^{\frac{1}{2}} - 2$

$y = \sqrt{x} - 2$

Domain: $[0, \infty)$

Range: $[-2, \infty)$

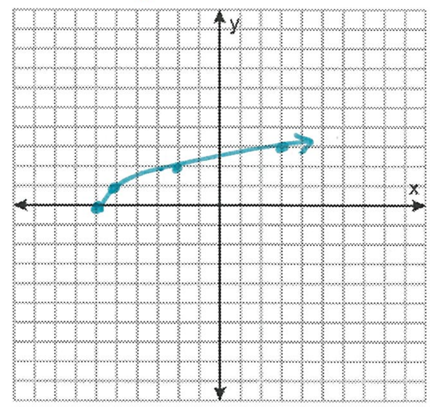


16. $y = \sqrt{x + 6}$

V: $(-6, 0)$

Domain: $x \geq -6$

Range: $y \geq 0$

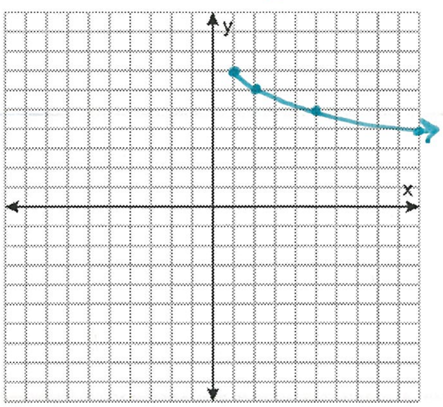


17. $y = -(x - 1)^{\frac{1}{2}} + 7$

$y = -\sqrt{x-1} + 7$

Domain: $[1, \infty)$

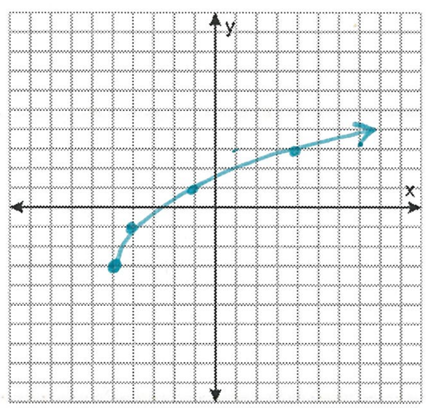
Range: $(-\infty, 7]$



18. $y = 2\sqrt{x + 5} - 3$

Domain: $[-5, \infty)$

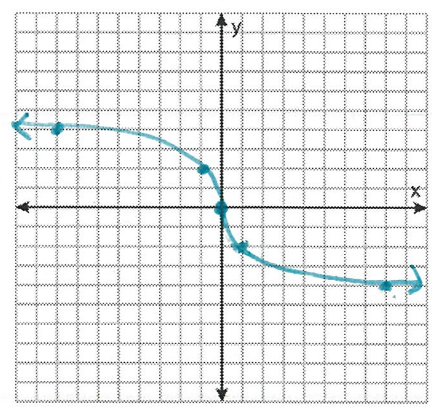
Range: $[-3, \infty)$



19. $y = -2x^{\frac{1}{3}}$ $y = -2\sqrt[3]{x}$

Domain: $\mathbb{R}$

Range: $\mathbb{R}$

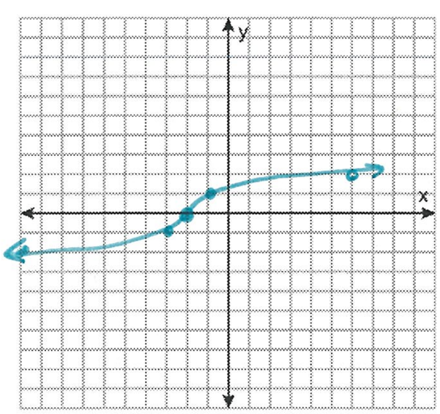


20. $y = (x + 2)^{\frac{1}{3}}$

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

Domain: $\mathbb{R}$

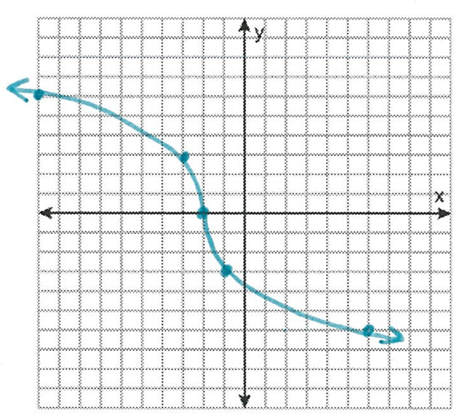
Range: $\mathbb{R}$



21. $y = -3\sqrt[3]{x + 2}$

Domain: $\mathbb{R}$

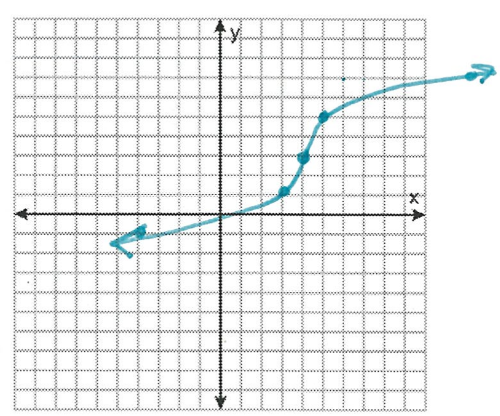
Range: $\mathbb{R}$



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

Domain: $\mathbb{R}$

Range: $\mathbb{R}$



Find the domain and range of the function without graphing.

23. $y = 2\sqrt{x} - 2$

V: (0, -2)

Domain: $x \geq 0$

Range: $y \geq -2$

24. $y = -\sqrt{x-3} - 7$

V: (3, -7)

Domain: $x \geq 3$

Range: $y \leq -7$

25. $y = \sqrt{x} - 13$

V: (13, 0)

Domain: $x \geq 13$

Range: $y \geq 13$

26. $y = \sqrt[3]{x+8}$

V: (-8, 0)

Domain: $\mathbb{R}$

Range: $\mathbb{R}$

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

V: (0, -5)

Domain: $\mathbb{R}$

Range: $\mathbb{R}$

28. $y = 4\sqrt[3]{x+4} + 7$

V: (-4, 7)

Domain: $\mathbb{R}$

Range: $\mathbb{R}$

In exercises 29-31, use a graphing calculator to graph the models. Then use the intersect feature to solve the problems.

29. When you look at the ocean, the distance d (in miles) you can see to the horizon can be modeled by $d = 1.22\sqrt{a}$ where a is your altitude (in feet above sea level). Graph the model and determine at what altitude you can see 10 miles.
Source: Mathematics in Everyday Things

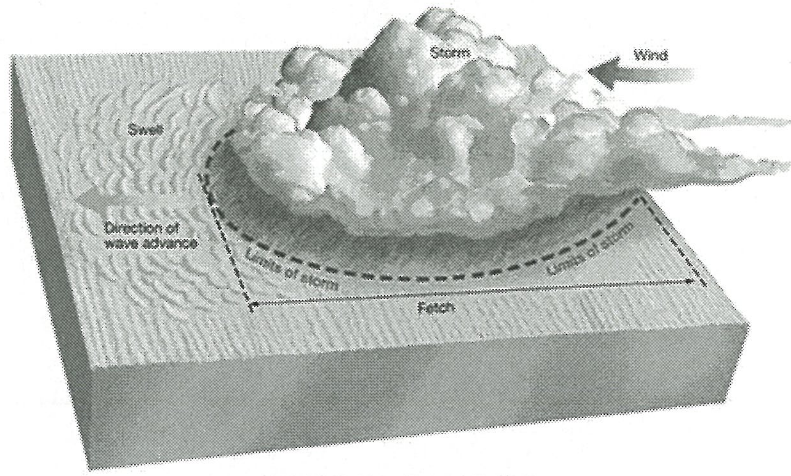
63.7 feet

30. Drag racing is an acceleration contest over a distance of a quarter mile. For a given total weight, the speed of a car at the end of the race is a function of the car's power. For a total weight of 3500 pounds, the speed s (in miles per hour) can be modeled by $s = 14.8\sqrt[3]{p}$ where p is the power (in horsepower). Graph the model. Then determine the power of a car that reaches a speed of 100 miles per hour. Source: The Physics of Sports

299.3 horsepower

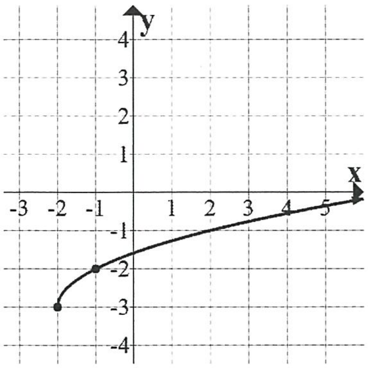
31. The fetch f (in nautical miles) of the wind at sea is the distance over which the wind is blowing. The minimum fetch required to create a fully developed storm can be modeled by
$s = 3.1\sqrt[3]{f+10} + 11.1$ where s is the speed (in knots) of the wind. Graph the model. Then determine the minimum fetch required to create a fully developed storm if the wind speed is 25 knots. Source: Oceanography

98.5 nautical miles



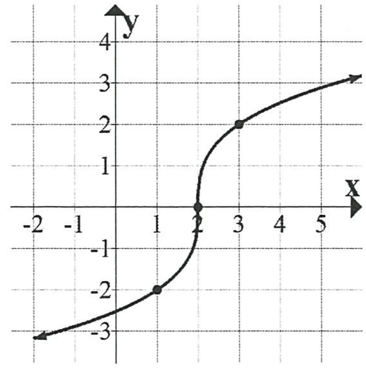
Write an equation for the function whose graph is shown.

32.



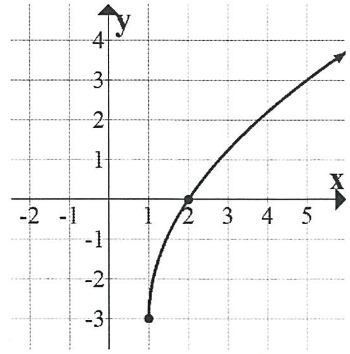
$y = \sqrt{x+2} - 3$

33.



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

34.



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

Solve the equations.

35. $2x^2 = 32$

$x^2 = 16$

$x = \pm 4$

36. $\frac{1}{2}x^2 - 5 = 13$

$\frac{1}{2}x^2 = 18$

$x^2 = 36$

$x = \pm 6$

Find the product.

37. $(x+4)^2$

$x^2 + 8x + 16$

38. $(2x^3 + 7)^2$

$4x^6 + 28x^3 + 49$

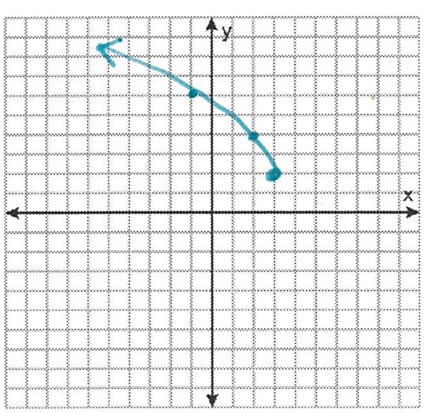
*Graph. State the domain and range. Describe what is unique about these graphs compared to the graphs you have been doing.

39. $y = 2\sqrt{3-x} + 2$ V: (3,2)

Domain: $(-\infty, 3]$

Range: $[2, \infty)$

reflect in y-axis



40. $y = \sqrt[3]{2x-6} + 1$ V: (3,1)

Domain: $\mathbb{R}$

Range: $\mathbb{R}$

horizontal shrink by 1/2