

## Square Root Function Practice Questions

### Properties of Radicals

1) Write each of the following expressions as a single radical

a)  $\sqrt{6} \cdot \sqrt{7}$

b)  $\frac{\sqrt{20}}{\sqrt{2}}$

c)  $11^{1/2} \cdot 15^{1/2}$

d)  $\frac{\sqrt{12} \cdot \sqrt{13}}{\sqrt{26} \cdot \sqrt{6}}$

e)  $\frac{\sqrt{115}}{\sqrt{5}} \div \frac{\sqrt{92}}{\sqrt{46}}$

f)  $\frac{\sqrt{a} \cdot \sqrt{b} \cdot \sqrt{c}}{\sqrt{2a} \cdot \sqrt{3b} \cdot \sqrt{5c}}$

2) Rationalize each of the following expressions

a)  $\frac{5}{\sqrt{7}}$

b)  $\frac{1}{\sqrt{13} + \sqrt{2}}$

c)  $\frac{3}{\sqrt{19} - \sqrt{42}}$

d)  $\frac{-12}{\sqrt{5} - \sqrt{11}}$

e)  $\frac{\sqrt{ab}}{\sqrt{a} - \sqrt{b}}$

f)  $\frac{\sqrt{a} - \sqrt{b}}{\sqrt{a} + \sqrt{b}}$

3) Reduce the radicand of each of the following expressions

a)  $\sqrt{48}$

b)  $\sqrt{500}$

c)  $2\sqrt{7c^2}$

d)  $2\sqrt{4a + 8b}$

### Square Root Function Basics

4) Match each of the rules below with its corresponding function

$$f(x) = 0.8\sqrt{-(x-1)} - 2$$

$$i(x) = \frac{1}{2}\sqrt{x+1} - 2$$

$$l(x) = -3\sqrt{-(x+2)} - 1$$

$$g(x) = -2\sqrt{-(x-2)} - 1$$

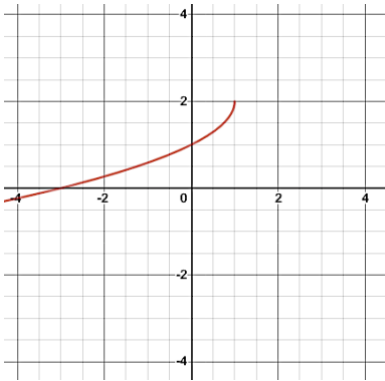
$$j(x) = 2.2\sqrt{-(x+1)} + 2$$

$$m(x) = -2.8\sqrt{x-1} + 2$$

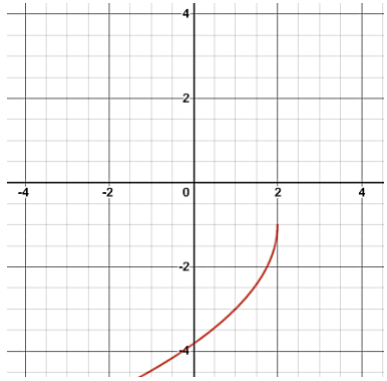
$$h(x) = -\sqrt{-(x-1)} + 2$$

$$k(x) = 1.6\sqrt{x+1} + 2$$

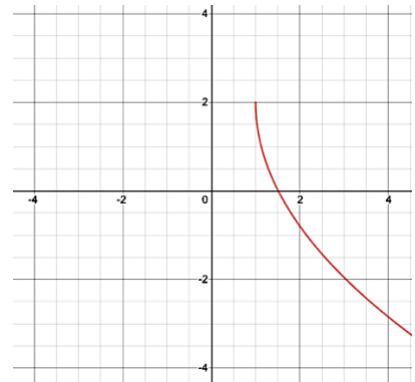
Function:



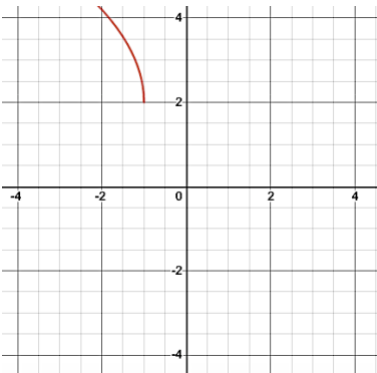
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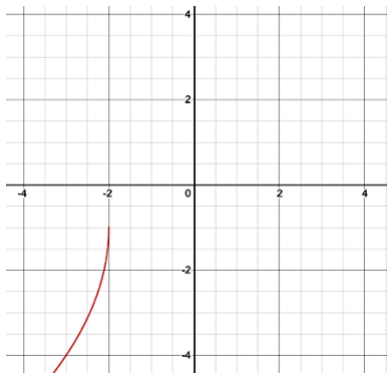
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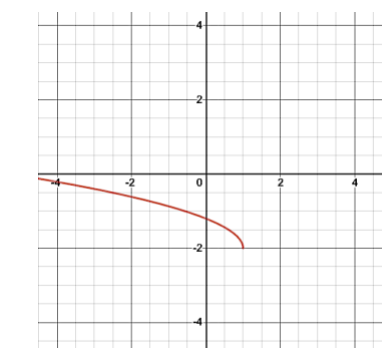
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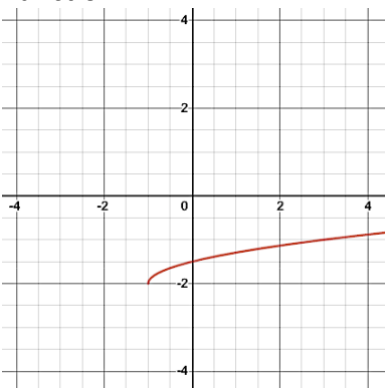
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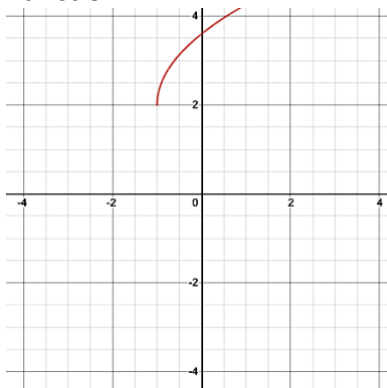
Function:



Function:



Function:



5) Given that  $h$  is the x-coordinate of the vertex of the curve of a square root function, among the functions listed, determine the one that is:

- a) increasing and for which the domain is  $]-\infty, h]$
- b) decreasing and for which the domain is  $[h, +\infty[$
- c) increasing and for which the domain is  $[h, +\infty[$
- d) decreasing and for which the domain is  $]-\infty, h]$

$$f(x) = 5\sqrt{-(x-3)} + 2$$

$$g(x) = -2\sqrt{x+7} - 4$$

$$h(x) = 0.4\sqrt{0.1x - 0.4} - 1$$

$$i(x) = -\frac{2}{3}\sqrt{-\left(\frac{x}{3} - 2\right)} + 10$$

6) For each of the functions below, transform the rule such that  $b = \pm 1$

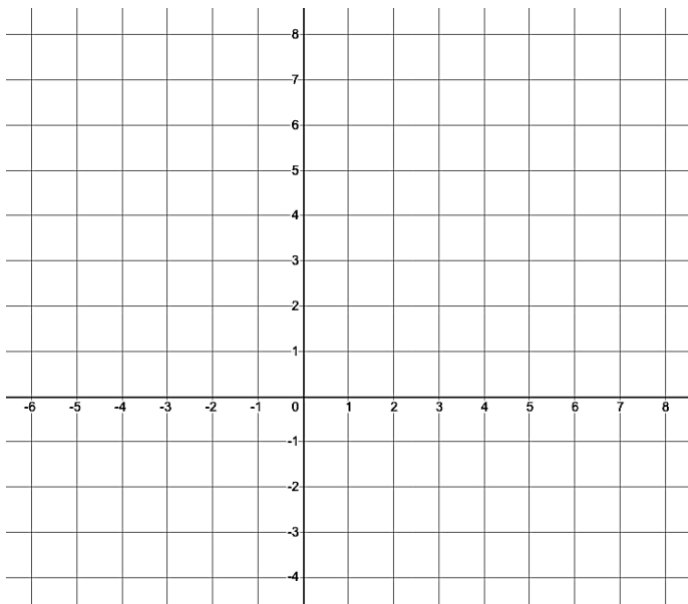
a)  $f(x) = 2\sqrt{25(x-1)} + 3$       b)  $g(x) = -4\sqrt{-9(x+7)} - 6$       c)  $h(x) = \sqrt{16x-48}$

7) The rule of a square root function is  $f(x) = 4\sqrt{x+6} - 5$

- a) What are the coordinates of the vertex of this function?
- b) Indicate the domain and range of this function.
- c) Describe the variation of this function.

8) Sketch the following functions.

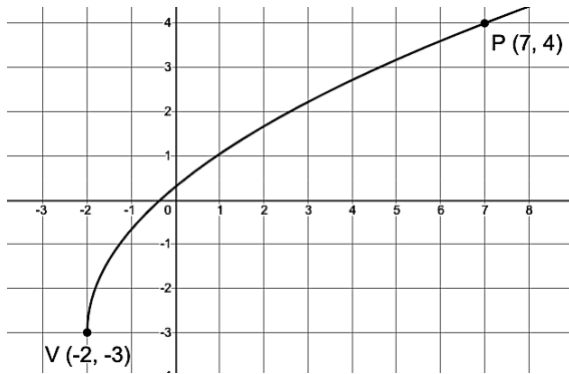
a)  $f(x) = -3\sqrt{x} + 7$       b)  $g(x) = 2\sqrt{1-x}$       c)  $h(x) = -\sqrt{2x+10} + 2$



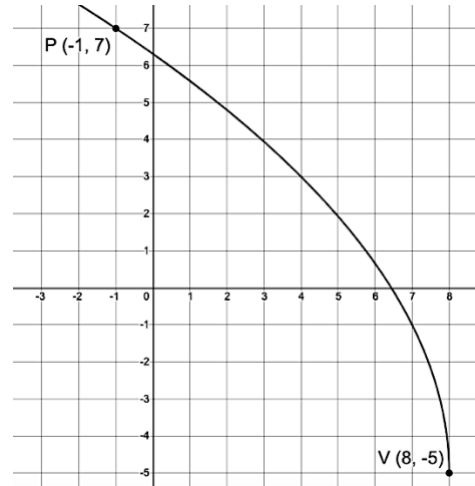
### Finding the Rule

9) Find the rule for each square root function using the coordinates of the vertices,  $V$ , and the coordinates of point  $P$ .

a)



b)



10) Find the rule of a square root function with a vertex of  $(4, 6)$  and an initial value of 10.

### Solving Equalities

11) Solve the following equations

a)  $\sqrt{x+2} = 9$

b)  $\sqrt{3x-15} = 12$

c)  $\sqrt{-(2x-4)} + 7 = 13$

d)  $3 = \sqrt{-\frac{4x}{3} + 2} - 2$

e)  $\frac{3}{5} = \sqrt{11 - \frac{x}{25}}$

f)  $2\sqrt{-(7x-8)} = \sqrt{x}$

12) For each equation below, determine the value of  $x$  when  $y = 6$ .

a)  $y = -10\sqrt{x-4} + 15$

b)  $y = 3\sqrt{-(x+2)} - 6$

c)  $y = -0.4\sqrt{0.3-x} - 0.16$

d)  $y = \frac{1}{2}\sqrt{7-9x} - 11$

### Solving Inequalities

13) Solve each of the following inequalities.

a)  $\sqrt{3x - 2} \geq 5$

b)  $2\sqrt{4 - x} \leq 26$

c)  $-0.5\sqrt{-11(x + 3)} - 7 < 14$

d)  $-23 > 0.5\sqrt{-11(x + 3)} - 7$

e)  $10\sqrt{0.1(9 - x)} + 5 \geq -1$

f)  $-\sqrt{-\frac{x}{12} - 1} + \frac{1}{3} \leq \frac{7}{3}$

### Word Problems

14) The speed,  $S$ , (in m/s) of a moving object is represented by the rule  $S = -12\sqrt{5t} + 60$ , where  $t$  represents the time (in s).

a) What is the initial speed of the object?

b) When does this object come to a stop?

c) Determine the time interval over which the speed of the moving object is less than 30 m/s

15) The rule  $f(x) = 25\sqrt{16 - x}$  defines the thickness (in cm) of the snow accumulated on the rooftop of a building according to the number of days elapsed since March 21 ( $x$ ).

a) What is the thickness of the snow on March 21?

b) At what moment:

1) will the initial amount of snow have decreased by half?

2) will all the snow be melted?

16) Following a furnace breakdown, the temperature inside a house varies according to the rule  $T(h) = -2\sqrt{h} + 20$  where  $T(h)$  is the temperature in degrees Celcius and  $h$  is the number of hours since the start of the breakdown, which lasted four full days.

a) Sketch function  $T$ .

b) What is the range of  $T$ ?

c) Sketch the inverse of  $T$ , state its rule and domain.

d) How long would the breakdown have to last for the temperature inside the house to reach the freezing point?

