Square Root of a Function Solutions

1. The graph of f(x) = $\left(\frac{-2}{3}\right)$x + 6 is transformed into y = $\sqrt{f(x)}$. The invariant points are at (a.b,c) (d,0). Find the values of a,b,c, and d.

Since the square root of 1 is equal to 1, and the square root of 0 is equal to 0, the values for y on the original function at y = 1 and y = 0, will be the same on the square root function. These are invariant points.

Using the equation f(x) above, substitute y = 1, and then y = 0, to find the x-coordinate of these invariant points.

For y = 1

1 = $\left(\frac{-2}{3}\right)x$ + 6

-5 = $\left(\frac{-2}{3}\right)x$

x = 7.5

For y = 0

0 = $\left(\frac{-2}{3}\right)x$ + 6

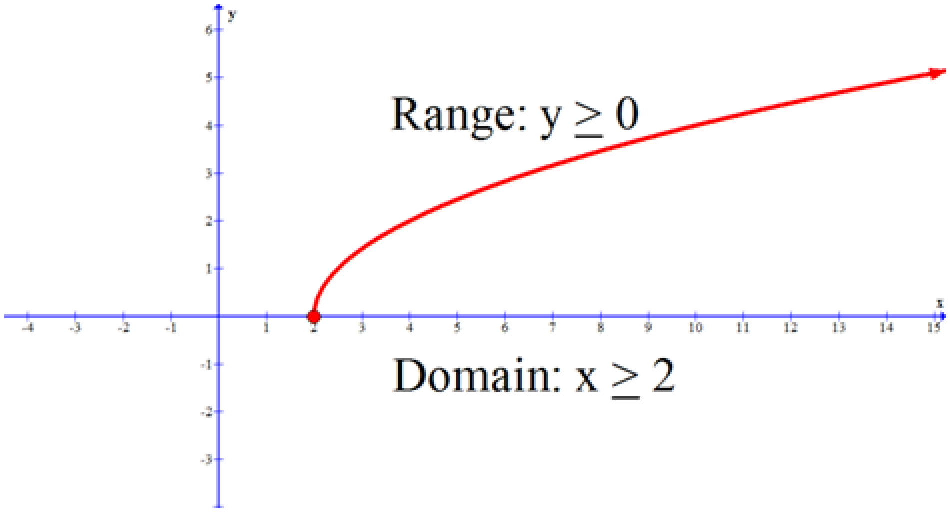
-6 = $\left(\frac{-2}{3}\right)x$

x = 9

The invariant points are (7.5, 1) and (9, 0).

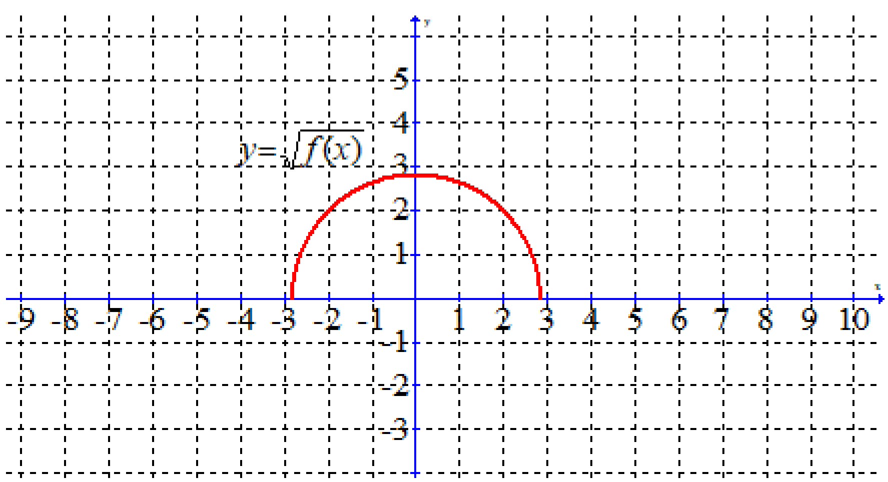
The values for a, b, c, and d, respectively are, **7519**

2. Given f(x) = 2x – 4, state the domain and range of $\sqrt{f(x)}$.



Use the following information to answer the next question.

The graph of y = $\sqrt{f(x)}$ is shown below.



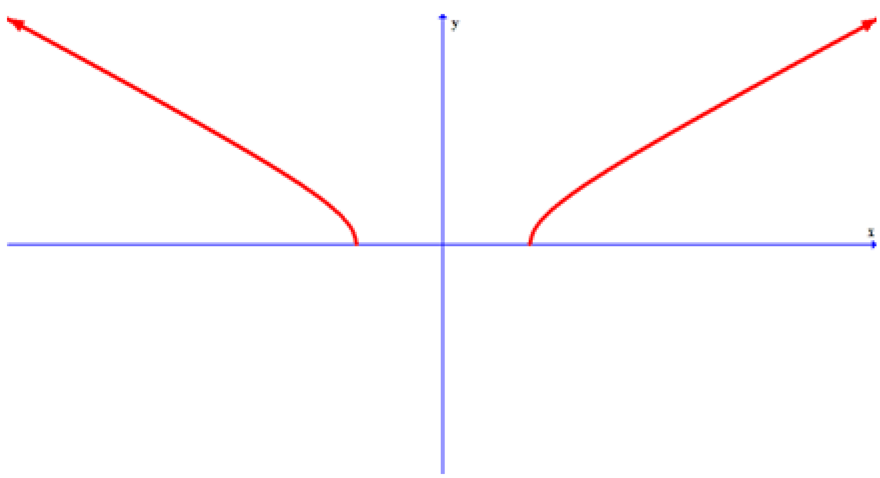
3. Which equation below would most likely represent y = f(x)?

a) $y = x + k$ b) $y = -x^2 + k$ c) $y = x^2 - k$ d) $y = x - k$

The general shape indicates an original quadratic function. Since 'a' and 'd' are linear functions, they can be eliminated as potential answers.

The quadratic equation listed in answer 'b' opens down and has a positive y-intercept, while the quadratic function listed in answer 'c' opens up with a negative y-intercept.

The general shape of a quadratic equation having the characteristics of answer 'c' is shown below.



The correct answer is b.

4. For each point on the graph of y = f(x), does a corresponding point on the graph of y = $\sqrt{f(x)}$ exist? If so, state the coordinates (rounded to 2 decimals if necessary)

a) (4, -7) b) (-1,9) c) (2,15)

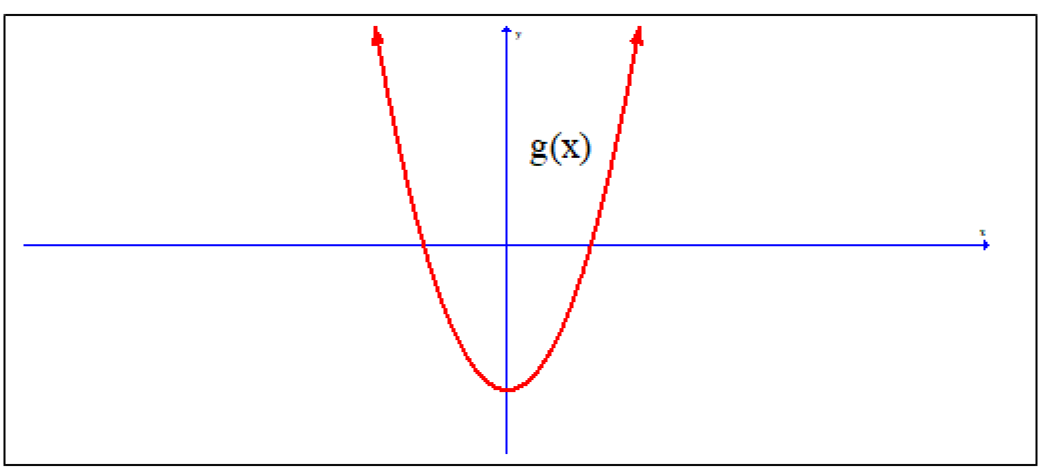
It is important to keep in mind that taking the square root of a function, means that for a given value of x on the original function, it is the square root of y that determines the new location of a transformed point.

For point a) above (4, -7), given the value of x = 4, the point should be moved to $\sqrt{-7}$. Since this is not possible, the point (4, -7) does not have a transformed point on y = $\sqrt{f(x)}$.

For point b) (-1,9), it is possible to find the square root of 9. Thus this point will move to (-1, 3).

For point c) (2,15), it is possible to find the square root of 15. Rounded to two decimal places, this point will move to (1, 3.87).

Use the graph below to answer the next question.



5. Which statement below is true?

a) The x-intercepts of y = g(x) and y = $\sqrt{g(x)}$ are different.

b) The y-intercepts of y = g(x) and y = $\sqrt{g(x)}$ are the same.

c) The y-intercept of y = $\sqrt{g(x)}$ does not exist.

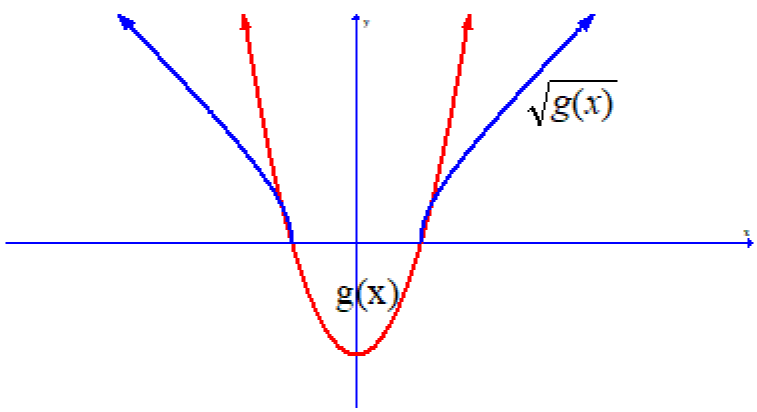
d) The x-intercepts of y = $\sqrt{g(x)}$ do not exist.

The answer to a) is false. The x-intercepts are the same.

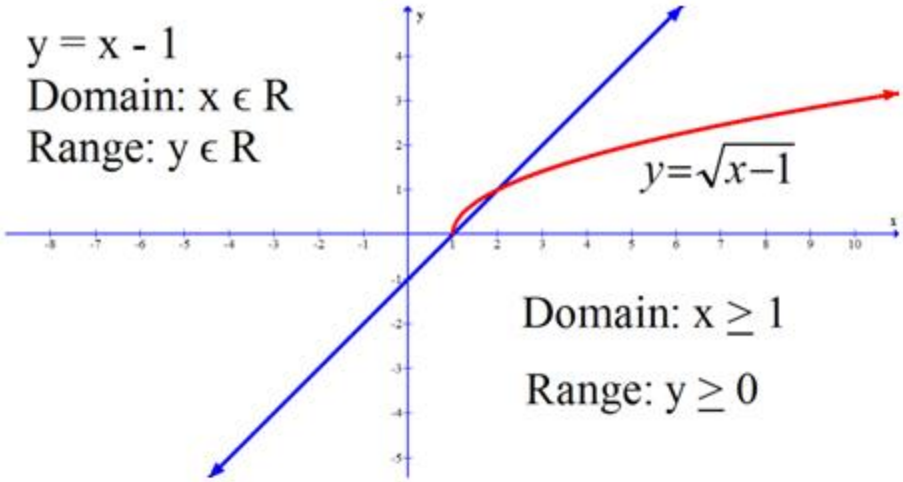
The answer to b) is false. The original function has a y-intercept, but the square root function does not have a y-intercept.

The answer to d) is false. The x-intercepts of the square root function do exist.

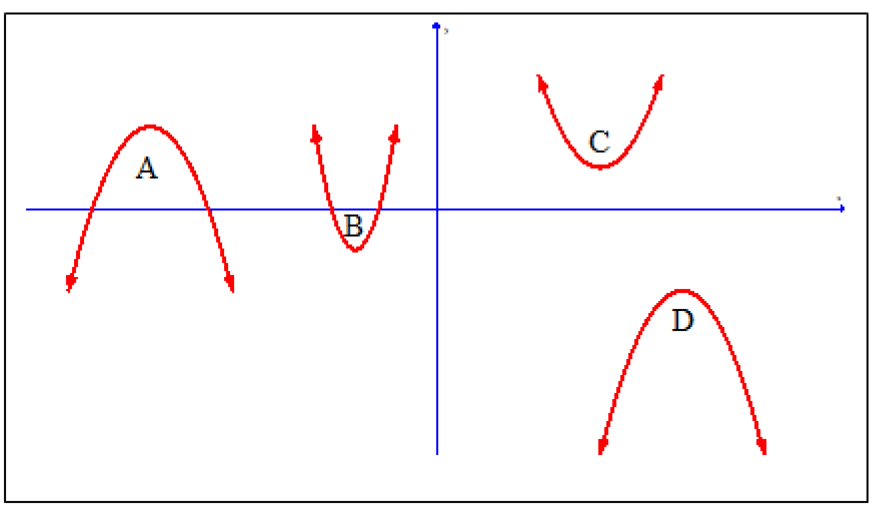
The correct answer is c).



6. Given y = x – 1 and y = $\sqrt{x-1}$, determine the domain and range of each function.



Use the graph below to answer the next question.



7. Use A, B, C, or D to fill in the blanks below.

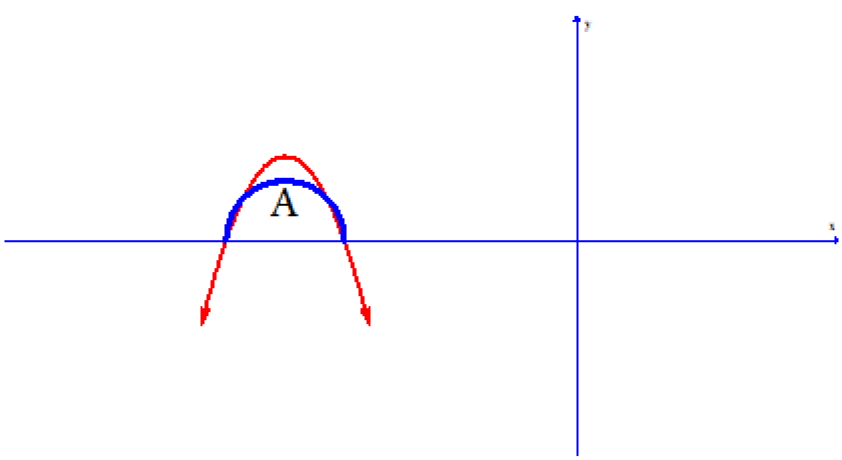
a) Which graph will have a non-existent square root function? __D_

On function D, all of the y values are negative. It is not possible to take the square root of a negative number.

b) Which graph will have a domain of real numbers for the square root function? __C__

For graph C, all of the y values are positive. Hence, for every x value, there will be an allowable value for the square root of y.

c) Which graph will have a domain of only negative numbers for the square root function? __A__

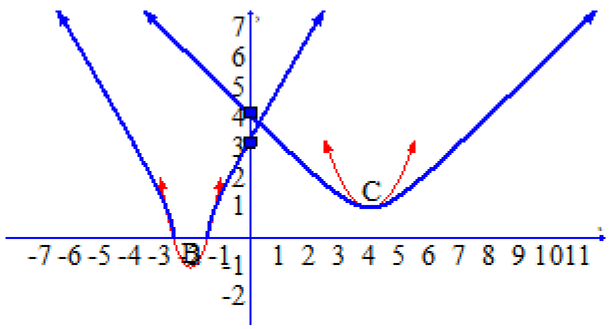


d) Which graph may have no invariant points (other than the non-existent function? _C__

As long as the lowest point of C is higher than 1, there would be no invariant points.

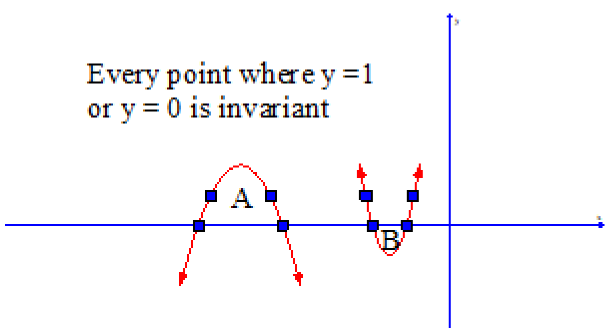
e) Which 2 graphs will have a y-intercept for the square root function?

__B__ and __C__

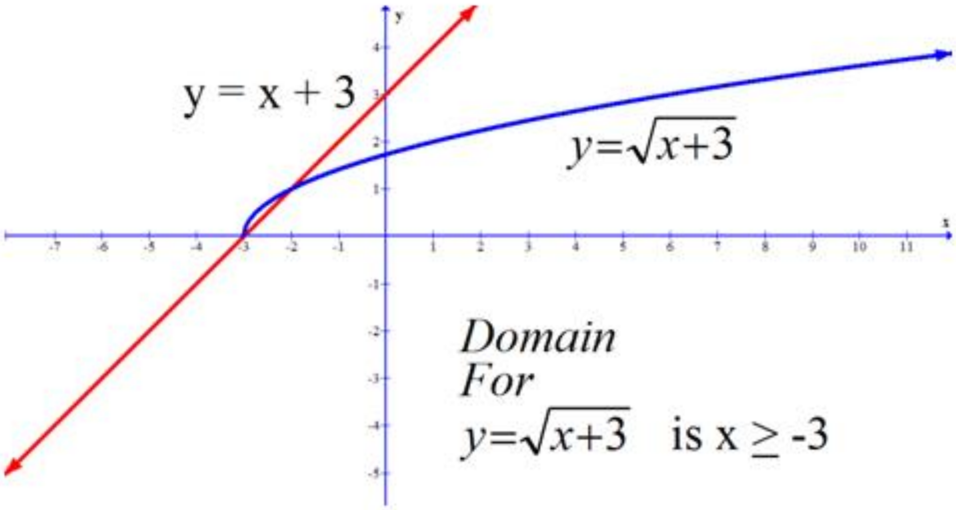


f) What is the total number of invariant points for A and B (assuming that the vertex of A is > 1)?

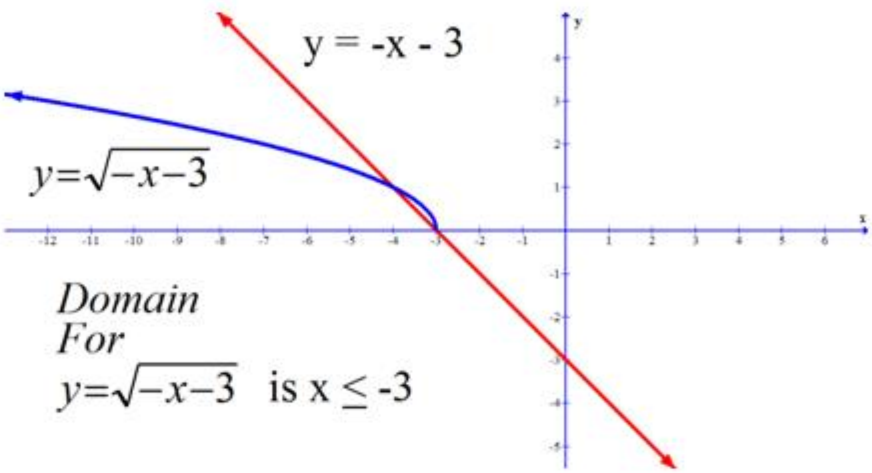
__8__



8. A linear function, y = f(x) has an x-intercept of -3. What are 2 possible domains for y = $\sqrt{f(x)}$?

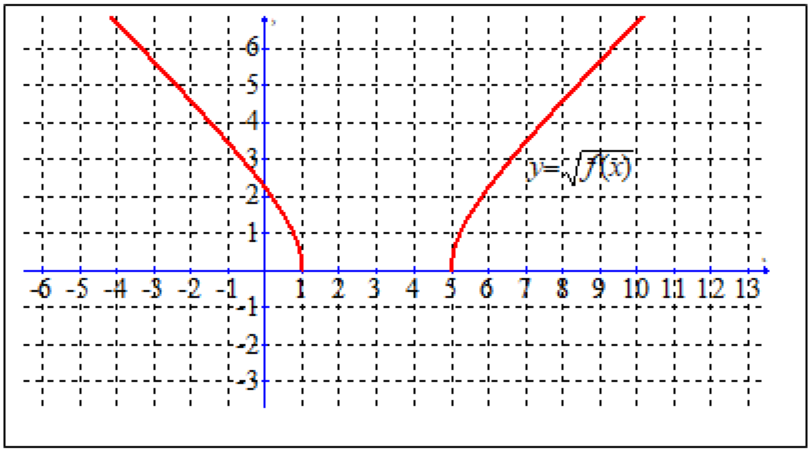


y = x + 3
$y=\sqrt{x+3}$
Domain
For
$y=\sqrt{x+3}$ is $x \geq -3$



y = -x - 3
$y=\sqrt{-x-3}$
Domain
For
$y=\sqrt{-x-3}$ is $x \leq -3$

Use the graph below to answer the next question.



9. The graph of y = $\sqrt{f(x)}$ is shown above. Which of the following points could not have been on y = f(x)?

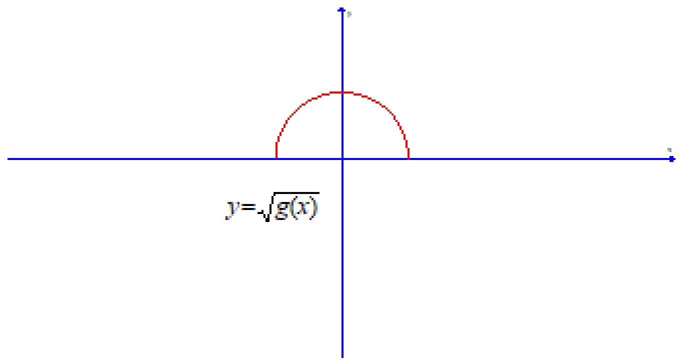
a) (4,3) b) (1,0) c) (0,5) d(-1,12)

If (4,3) was on the graph of y = f(x), then the point (4, $\sqrt{3}$) would be on the square root function of y = f(x). The graph shows that this point is not on $y = \sqrt{f(x)}$.

For all other answers given as potential points on the square root of f(x), for the given value of x, the square root of y is on the graph.

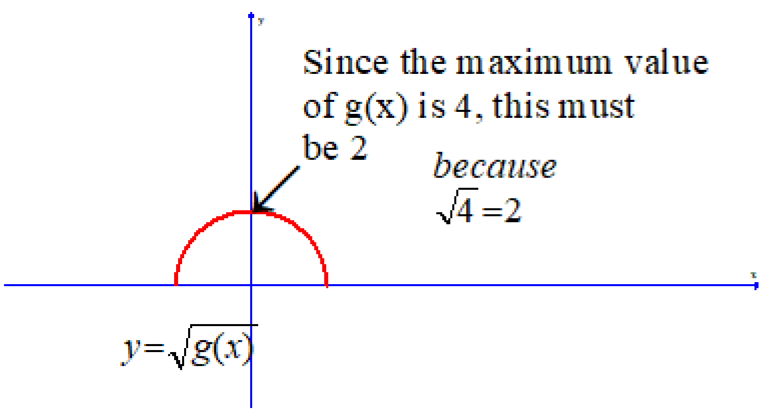
Use the graph below to answer the next question.

The range of g(x) is $(-\infty,4]$. The graph of y = $\sqrt{g(x)}$ is shown below.



10. The range of y = $\sqrt{g(x)}$ can be written as [a,b]. What are the values of a and b?

The range of g(x) is $(-\infty,4]$. The graph of y = $\sqrt{g(x)}$ is shown below.



The value of a is 0 and the value of b is 2.