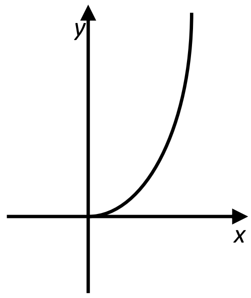
FUNCTIONS 5: QUIZ SOLUTIONS

Queston 1

If $f(x)=x^2,\ x\geq 0$, state whether its inverse is a one-to-one function, a many-to-one function, or not a function.



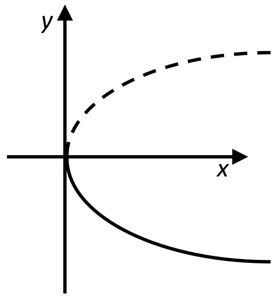
Solution

. If $f(x)=x^2,\ x\geq 0$, then its graph looks like this:

So, it is a one-to-one function.

Question 2

Is $f(x)=\pm\sqrt{x}$ a one-to-one function, a many-to-one function, or not a function?



Solution

If $f(x)=\pm\sqrt{x}$, then its graph looks like this:

So, it is not a function.solu

Question 3

If $f(x)=2x^2,\ x\geq 0,$ then its inverse is a one-to-one function given by

A. $f^{-1}(x)=2\sqrt{x},\ x\geq 0$ B. $f^{-1}(x)=\sqrt{\dfrac{x}{2}},\ x\geq 0$

C. $f^{-1}(x)=\sqrt{2x},\ x\geq 0$ D. $f^{-1}(x)=\dfrac{\sqrt{x}}{2},\ x\geq 0$

Solution

If $f(x)=2x^2,\ x\geq 0,$ If $y=2x^2$, put $x=2y^2$

$$\therefore 2y^2=x$$

$$\therefore y^2=\frac{x}{2}$$

$$\therefore y=\pm\sqrt{\frac{x}{2}}$$

But $x\geq 0$, so $y=\sqrt{\dfrac{x}{2}}$.

So, the correct answer is B. $f^{-1}(x)=\sqrt{\dfrac{x}{2}},\ x\geq 0$.

Question 4

If $f(x) = x^2 + 4$, what are the restrictions on the domain of *f* so that its inverse is a one-to-one function?

Solution

$$f(x) = x^2 + 4$$

$$\text{Put } x = y^2 + 4$$

$$\therefore y = \pm\sqrt{x^2 - 4}$$

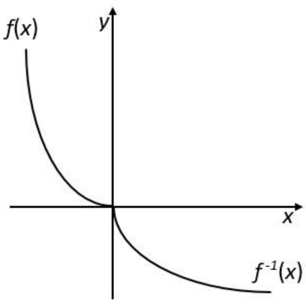
$$\therefore f(x)^{-1} = \sqrt{x^2 - 4} \text{ or } -\sqrt{x^2 - 4}$$

For the inverse to be a one-to-one function, the domain of *f* must be $x \le 0$, or $x \ge 0$.

For the inverse, $x \ge 4$.

Question 5

A function and its inverse are shown in the following graph.



If the function is $f(x) = 3x^2$, $x \le 0$, what is its inverse?

Solution

If $f(x) = 3x^2$, $x \le 0$, then $f^{-1}(x) = -\sqrt{\dfrac{x}{3}}$, $x \ge 0$.