FUNCTIONS 10: QUIZ SOLUTIONS

Question 1

A function is defined as $f(x) = -3x^2$. What are its domain and range?

Solutions

The domain and range of $f(x) = -3x^2$ are $(-\infty;\ \infty)$ and $(-\infty;\ 0]$.

Question 2

A function is defined as $f(x) = -\frac{x^2}{4},\ x \geq 0$. What are the domain and range of its inverse?

Solution

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

$$\therefore y^2 = -4x$$

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

So, the inverse of $f(x) = -\frac{x^2}{4}, x \geq 0$ is $f^{-1}(x) = -2\sqrt{-x},\ x \leq 0$.

The domain of $f^{-1}(x)$ is $(-\infty;\ 0]$ and the range is $[0;\ \infty)$.

Question 3

If the inverse of a certain function is $f^{-1}(x) = -\frac{1}{3}\sqrt{-x},\ x \leq 0$, what is the function *f*(x)?

Solution

$$\text{Put } x = -\tfrac{1}{3}\sqrt{-y}\ ,$$

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

$$\therefore 9x^2 = -y$$

$$\text{So, } f(x) = -9x^2, x \leq 0.$$

Question 4

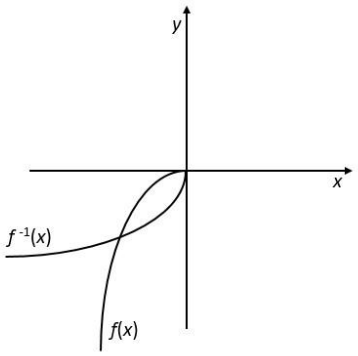
If a function is defined by $f(x)=ax^2,\ a>0,\ x\le 0$, then the function and its inverse are symmetric about which line?

Solution

The line of symmetry is $y = x$, or $x - y = 0$.

Question 5

Which function and its inverse are shown by the following graph?



A. $f(x)=16x^2,\ x\le 0;\quad f^{-1}(x)=\frac{1}{4}\sqrt{x},\ x\le 0$

B. $f(x)=4x^2,\ x\le 0;\quad f^{-1}(x)=\frac{1}{4}\sqrt{x},\ x\le 0$

C. $f(x)=-16x^2,\ x\le 0;\quad f^{-1}(x)=-\frac{1}{4}\sqrt{-x},\ x\le 0$

D. $f(x)=-4x^2,\ x\le 0;\quad f^{-1}(x)=-\frac{1}{4}\sqrt{-x},\ x\le 0$

Solution

C. $f(x)=-16x^2,\ x\le 0;\quad f^{-1}(x)=-\frac{1}{4}\sqrt{-x}\ \ x\le 0$