FUNCTIONS 7: QUIZ SOLUTIONS

Question 1

If $f(x)=\frac{1}{2}x^2$, what are its domain and range?

Solution

The domain of $f(x)=\frac{1}{2}x^2$ is $x\in R$, or $(-\infty;\ \infty)$ and the range is $y\in R,\ y\geq 0$, or $[0;\ \infty)$

Question 2

If $f(x)=2x^2,\ x\leq 0$, what are the domain and range of its inverse?

Solution

The inverse of $f(x)=2x^2, x\leq 0$ is $f^{-1}(x)=-\sqrt{\frac{x}{2}},\ x\geq 0$. So, the domain of the inverse is $x\in R,\ x\geq 0$, or $[0;\ \infty)$ and the range is $y\in R,\ y\leq 0$, or $(-\infty;\ 0]$.

Question 3

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

Solution

$$\text{Put } x=-\sqrt{\frac{y}{3}}$$

$$\therefore x^2=\frac{y}{3}$$

$$\text{then } f(x)=3x^2, x\leq 0.$$

Question 4

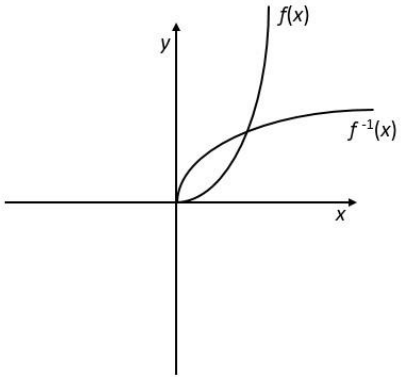
A function is defined by $f(x)=ax^2,\ a>0,\ x\geq 0$. What is the equation of the line of symmetry of the function and its inverse?

Solution

The function and its inverse are symmetric about the line $x-y=0$, or $y = x$.

Question 5

A function and its inverse are shown in the graph. If the function is $f(x)=4x^2,\ x\geq 0$, what is its inverse?



Solution

$$f(x)=4x^2,\ x\geq 0$$

$$y=4x^2$$

Put $x=4y^2$

$$\therefore y^2=\frac{x}{4}$$

then $f^{-1}(x)=\frac{1}{2}\sqrt{x},\ x\geq 0$.