Section 3-4 : The Definition of a Function

For problems 1 – 3 determine if the given relation is a function.

1. $\{(2,4),(3,-7),(6,10)\}$

2. $\{(-1,8),(4,-7),(-1,6),(0,0)\}$

3. $\{(2,1),(9,10),(-4,10),(-8,1)\}$

For problems 4 – 6 determine if the given equation is a function.

4. $y = 14 - \frac{1}{3}x$

5. $y = \sqrt{3x^2 + 1}$

6. $y^4 - x^2 = 16$

7. Given $f(x) = 3 - 2x^2$ determine each of the following.

   (a) $f(0)$ (b) $f(2)$ (c) $f(-4)$ (d) $f(3t)$ (e) $f(x+2)$

8. Given $g(w) = \frac{4}{w+1}$ determine each of the following.

   (a) $g(-6)$ (b) $g(-2)$ (c) $g(0)$ (d) $g(t-1)$ (e) $g(4w+3)$

9. Given $h(t) = t^2 + 6$ determine each of the following.

   (a) $h(0)$ (b) $h(-2)$ (c) $h(2)$ (d) $h(\sqrt{x})$ (e) $h(3-t)$

10. Given $h(z) = \begin{cases} 3z & \text{if } z < 2 \\ 1 + z^2 & \text{if } z \ge 2 \end{cases}$ determine each of the following.

    (a) $h(0)$ (b) $h(2)$ (c) $h(7)$

11. Given $f(x) = \begin{cases} 6 & \text{if } x \ge 9 \\ x + 9 & \text{if } 2 < x < 9 \\ x^2 & \text{if } x \le 2 \end{cases}$ determine each of the following.

(a) $f(-4)$ (b) $f(2)$ (c) $f(6)$ (d) $f(9)$ (e) $f(12)$

For problems 12 & 13 compute the difference quotient for the given function. The difference quotient for the function $f(x)$ is defined to be,

$$\frac{f(x+h)-f(x)}{h}$$

12. $f(x)=4-9x$

13. $f(x)=2x^2-x$

For problems 14 – 18 determine the domain of the function.

14. $A(x)=6x+14$

15. $f(x)=\dfrac{1}{x^2-25}$

16. $g(t)=\dfrac{8t-24}{t^2-7t-18}$

17. $g(w)=\sqrt{9w+7}$

18. $f(x)=\dfrac{1}{\sqrt{x^2-8x+15}}$