ASSIGNMENT

CLASS XI RELATIONS AND FUNCTIONS

1. A and B are two sets given in such a way that $A\times B$ contains 6 elements. If three elements of $A\times B$ be $(1,3),(2,5)$ and $(3,3)$, find its remaining elements.

2. If $A=\{x:x^2-5x+6=0, x\in N\}$, $B=\{x:0\le x<2, x\in W\}$ and $C=\{x:x<3, x\in N\}$, then verify that:

$(i)\ A\times(B\cup C)=(A\times B)\cup(A\times C)$ $(ii)\ A\times(B\cap C)=(A\times B)\cap(A\times C)$

$(iii)\ (A-B)\times C=(A\times C)-(B\times C)$ $(iv)\ (A\cap B)\times C=(A\times C)\cap(B\times C)$

3. Let $A=\{2,3,5,7\}$ and $B=\{3,5,9,13,15\}$. Let $f=\{(x,y):x\in A, y\in B \text{ and } y=2x-1\}$. Write f in the roster form. Show that f is a function from A to B. Find the domain and range of f.

4. Let $R=\{(x,y):x,y\in Z, y=2x-4\}$. If $(a,-2)$ and $(4,b^2)$ belongs to R, find the values of a and b.

5. Let A be the set of first ten natural numbers and let R be a relation on A defined by $(x,y)\in R \Leftrightarrow x+2y=10$ i.e. $R=\{(x,y):x\in A \text{ and } y\in B \text{ and } x+2y=10\}$. Express R as sets of ordered pairs.

6. A relation R is defined on the set Z of integers as follows: $(x,y)\Leftrightarrow x^2+y^2=25$. Express R as the set of ordered pairs.

7. If $f(x)=x^2-3x+1$, find $x\in R$ such that $f(2x)=f(x)$.

8. If $f:R\to R$ is defined by $f(x)=\dfrac{x}{x^2+1}$, find $f(f(2))$.

9. Find the domain for which the function $f(x)=2x^2-1$ and $g(x)=1-3x$ are equal?

10. Find the domain and the range of the following functions:

(a) $f(x)=\dfrac{1}{x-3}$ (b) $f(x)=\dfrac{1}{1-x^2}$ (c) $f(x)=\sqrt{(x-1)(3-x)}$ (d) $f(x)=\dfrac{x-2}{3-x}$

(e) $f(x)=\dfrac{1}{\sqrt{x-5}}$ (f) $f(x)=\dfrac{3}{2-x^2}$ (g) $f(x)=\dfrac{4-x}{x-4}$ (h) $f(x)=11-7\sin x$

11. Draw the graph of the following functions:

(a) $y-3=(x+2)^2$ (b) $y=|x-4|-3$ (c) $y=\sqrt{16-x^2}$ (d) $y=[x-1]$

ANSWERS

1. $(1,5),(2,3)$ and $(3,5)$ 3. $f=\{(2,3),(3,5),(5,9),(7,13)\}$, $\text{dom}(f)=\{2,3,5,7\}$, $\text{range}(f)=\{3,5,9,13\}$

4. $a=1, b=\pm 2$ 5. $R=\{(2,4),(4,3),(6,2),(8,1)\}$

6. $R=\{(0,5),(0,-5),(3,4),(-3,4),(3,-4),(-3,-4),(4,3),(-4,3),(4,-3),(-4,-3),(5,0),(-5,0)\}$

7. $x=0,1$ 8. $\dfrac{10}{29}$ 9. $\left\{-2,\dfrac{1}{2}\right\}$

10. (a) $\text{dom}(f)=R-\{3\}$, $\text{range}(f)=R-\{0\}$ (b) $\text{dom}(f)=R-\{-1,1\}$, $\text{range}(f)=(-\infty,0)\cup[1,\infty)$

(c) $\text{dom}(f)=[1,3]$, $\text{range}(f)=[0,1]$ (d) $\text{dom}(f)=R-\{3\}$, $\text{range}(f)=R-\{-1\}$

(e) $\text{dom}(f)=(5,\infty)$, $\text{range}(f)=(0,\infty)$ (f) $\text{dom}(f)=R-\{-\sqrt{2},\sqrt{2}\}$, $\text{range}(f)=(-\infty,0)\cup\left[\dfrac{3}{2},\infty\right)$

(g) $\text{dom}(f)=R-\{4\}$, $\text{range}(f)=\{-1\}$ (h) $\text{dom}(f)=R$, $\text{range}(f)=[4,18]$