Class 11 Solutions Chapter 2 Relations Ex 2.1 Q9

Let (a,b) be an arbitrary element of $(A\times B)\cap(B\times A)$. Then,

$$
\begin{array}{llcl}
 & (a,b)\in(A\times B)\cap(B\times A) & & \\
\Leftrightarrow & (a,b)\in A\times B & \text{and} & (a,b)\in B\times A \\
\Leftrightarrow & (a\in A \text{ and } b\in B) & \text{and} & (a\in B \text{ and } b\in A) \\
\Leftrightarrow & (a\in A \text{ and } a\in B) & \text{and} & (b\in A \text{ and } b\in B) \\
\Leftrightarrow & a\in A\cap B & \text{and} & b\in A\cap B
\end{array}
$$

Hence, the sets $A\times B$ and $B\times A$ have an element in comon iff the sets A and B have an element in common.

Chapter 2 Relations Ex 2.1 Q10

Since $(x,1)$, $(y,2)$, $(z,1)$ are elements of $A\times B$. Therefore, x, y, $z\in A$ and $1,2\in B$

It is given that $n(A)=3$ and $n(B)=2$

$\therefore \quad x,\ y,\ z\in A$ and $n(A)=3$

$\Rightarrow \quad A=\{x,y,z\}$

$1,2\in B$ and $n(B)=2$

$\Rightarrow \quad B=\{1,2\}$.

Chapter 2 Relations Ex 2.1 Q11

We have,

$A=\{1,2,3,4\}$

and, $R=\{(a,b)=a\in A,\ b\in A,\ a \text{ divides } b\}$

Now,

a/b stands for 'a divides b'. For the elements of the given sets, we find that $1/1$, $1/2$, $1/3$, $1/4$, $2/2$, $3/3$ and $4/4$

$\therefore\ R=\{(1,1),\ (1,2),\ (1,3),\ (1,4),\ (2,2),\ (2,4),\ (3,3),\ (4,4)\}$

Chapter 2 Relations Ex 2.1 Q12

We have,

$A=\{-1,1\}$

$\therefore\quad A\times A=\{-1,1\}\times\{-1,1\}$

$=\{(-1,-1),\ (-1,1),\ (1,-1),\ (1,1)\}$

$\therefore\quad A\times A\times A=\{-1,1\}\times\{(-1,-1),\ (-1,1),\ (1,-1),\ (1,1)\}$

$=\{(-1,-1,-1),\ (-1,-1,1),\ (-1,1,-1),\ (-1,1,1),\ (1,-1,-1),\ (1,-1,1),\ (1,1,-1),\ (1,1,1)\}$

Chapter 2 Relations Ex 2.1 Q13

(i) False,

If $P=\{m,n\}$ and $Q=\{n,m\}$,

Then,

$P\times Q=\{(m,n),\ (m,m),\ (n,n),\ (n,m)\}$

(ii) False,

If A and B are non-empty sets, then AB is a non-empty set of ordered pairs (x,y) such that $x\in A$ and $y\in B$.

(iii) True

*********** END **********