Symmetric difference of sets -

If A and B are two sets then the set $(A-B) \cup (B-A)$ is called the symmetric difference of sets A and B and it is denoted by $A \oplus B$ or $A \triangle B$

$\oplus$ or $\triangle$ = Symmetric

Ex-

If $A = \{1,2,3,4\}$, $B = \{2,3,5\}$

$A - B = \{1,4\}$, $B - A = \{5\}$

$A \oplus B = (A-B) \cup (B-A) = \{1,4,5\}$

Date
Page

Cartesian product of two sets -

Let A and B are two sets then, $A \times B = \{(a,b) : a \in A, b \in B\}$ is called cartesian product of A and B.

Ex -

(1) If $A = \{a,b\}$ and $B = \{c,d\}$

find the cartesian product of A and B -

$A \times B = \{(a,c), (a,d), (b,c), (b,d)\}$

(2)

$A = \{a,b\}$ and $B = \{c,d,e\}$, find $A \times B$ -

$A \times B = \{(a,c), (a,d), (a,e), (b,c), (b,d), (b,e)\}$

Note -

If set A has m elements and set B has n elements then $A \times B = m \times n$ elements.

Properties -

If A, B, C are three sets then,

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

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

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

iv) $A \times B = \phi \Leftrightarrow A = \phi$ or $B = \phi$

Date
Page

Relations –

Let x be a set A subset R of $x \times x$ is called a relation on x i.e. $R \subseteq x \times x$.

If $(x, y) \in R$ then we say x is related to y. It is denoted by xRy (x relation to y).

Ex –

Let $x = \{a, b, c\}$ then

$R = \{(a, b), (b, a), (a, c)\}$ is relation on x because $R \subseteq x \times x$

$x \times x = \{(a, a), (b, b), (c, c), (a, b), (a, c),$

Note –

The total number of relation a set containing n elements is equal to (2^{n^2}).