Lecture #2

Operations on Sets

1) Complement
2) Union
3) Intersection
4) Difference
5) Cartesian product.

(1)

Complement.

Union of set:

The Union of two sets is a set containing all element that are in 'A' or in 'B' or in both 'A' and 'B'

Symbol

$A \cup B$

Example

$A = \{1, 2, 3, 4\}$, $B = \{2, 5, 6\}$

$A \cup B = ?$

$A \cup B = \{1, 2, 3, 4\} \cup \{2, 5, 6\}$

$= \{1, 2, 3, 4, 5, 6\}$

(2)

Intersection of two sets:

The intersection of two sets 'A' and 'B' is the set that contains all elements of 'A' that also belongs to 'B'

Symbol

$A \cap B$

Example

$A = \{1, 2, 3, 4\}$, $B = \{2, 5, 6\}$

$A \cap B = ?$

$A \cap B = \{1, 2, 3, 4\} \cap \{2, 5, 6\}$

$\boxed{A \cap B = \{2\}}$

(3)

Difference of two sets

The difference of two sets is the set of all element of 'A' that are not elements of 'B'.

Symbol

$A - B$

Example

$A = \{1, 2, 3, 4\}$, $B = \{2, 5, 6\}$

$A - B = ?$

$A - B = \{1, 2, 3, 4\} - \{2, 5, 6\}$

$\boxed{A - B = \{1, 3, 4\}}$

(4)

Cartesian product:

A cartesian product of two sets 'A' and 'B' is the set containing ordered pairs from 'A' and 'B'

Symbol

$A \times B$

Example

$A = \{1, 2, 3\}$, $B = \{c, d\}$

$A \times B = ?$

$A \times B = \{(1, c)(1, d)(2, c)(2, d)(3, c)(3, d)\}$

Complement of set:

The complement of a set 'A' is the set of all elements in the universal set U, but not in 'A'.

Symbol: A' or A^c

Example:

$U = \{1, 2, 3, 4, 5, 6\}$, $A = \{1, 2, 3\}$

$A' = ?$

$A' = U - A$

$= \{1, 2, 3, 4, 5, 6\} - \{1, 2, 3\}$

$A' = \{4, 5, 6\}$

So, $\boxed{A' = \{4, 5, 6\}}$