Operations on Sets

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Union of Sets

Let A and B be two non–empty sets. The union of A and B is the set which consists of all the elements of A and all the elements of B and the common elements of A and B are taken only once.

We denote union of two sets by the symbol ‘U’ and write as A U B and usually read as ‘A union B’.

Example: Let A = {2, 4, 6, 8, 10} and B = {1, 3, 5, 7, 9} be two sets
So, A U B = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}

Thus, we can define the union of two sets as:
The union of two sets A and B is the set C which consists of all those elements which are either in A or in B (including those which are in both)

A U B = {x: x ? A or x ? B}

Properties of the Operation of Union

1) A U B = B U A(Commutative law)

2) (A U B) U C = A U (B U C)(Associative law)

3) A U ? = A (Law of Identity element, ? is the identity of U)

4) A U A = A(Idempotent law)

5) U U A = U (Law of U)

Intersection of Sets

Let A and b be two non–empty sets. The intersection of sets A and B is the set of all elements which are common to both A and B.

We denote intersection of two sets by the symbol ‘?’ and write as A ? B and usually read as ‘A intersection B’.

Example: Let A = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10} and B = {2, 3, 5, 7} be two sets

So, A ? B = {2, 3, 5, 7}

From the above discussion, the intersection of two sets A and B is the set of all those elements which belong to both A and B.

A ? B = {x: x ? A and x ? B}

Properties of the Operation of Intersection

1) A ? B = B ? A (Commutative law)

2) (A ? B) ? C = A ? (B ? C) (Associative law)

3) ? ? A = ?, U ? A = A (Law of ? and U)

4) A ? A = A

5) A ? (B ? C) = (A ? B) ? (A ? C)(Distributive law)

Difference of Sets

If A and B are two non–empty sets then the difference of the sets A and B in the same order is the set of elements which belong to A but not to B.
We write it as, A – B and read as A minus B.
Example: Let A = {2, 3, 5, 6, 9} and B = {1, 2, 4, 6, 9}, find A – B and B – A.
A – B = {3, 5}, since the elements 3, 5 belong to A but not to B.
B – A = {1, 4}, since the elements 1, 4 belong to B but not to A.

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Reference Links:

- http://en.wikipedia.org/wiki/Set_(mathematics)#Basic_operations
- http://en.wikipedia.org/wiki/Union_(set_theory)
- http://en.wikipedia.org/wiki/Intersection_(set_theory)
- http://en.wikipedia.org/wiki/Difference_set
- http://en.wikipedia.org/wiki/Commutativity
- http://en.wikipedia.org/wiki/Associativity
- http://en.wikipedia.org/wiki/Identity_element
- http://www.encyclopedia.com/doc/1O11-idempotentlaw.html
- http://en.wikipedia.org/wiki/Distributivity

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