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Maths Scribed Notes - Lecture 14

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A partition of sets is a collection of subsets that need not to cover the whole set.

In a partition no element belong to more than 1 subset, and every belong to a subset.

A relation is always on a set.

Equivalence Relation: Binary relation which is reflexive, transitive and symmetric and it has direct relation to Cartesian product.

Eg. {5, 7, 35}
Here, 5 is related to 35, 7 is related to 35 but 5 ***is not*** related to 7.
Therefore, it is not transitive and so it cannot be called an equivalence relation.

Equivalence Relation Partition:
A partition of a set is a collection of disjoint subsets of a set, such that their union is the whole set.

$$A = \bigcup_{i=1}^{t} A$$

and

$$1 \leqslant i < j \leqslant t; \qquad A_i \cap A_j = \Phi$$

Example -
A= (1, 2, 3, 4, 5, 6, 7, 8)
A1 = (1, 3, 5)
A2 = (2, 4, 7)
A3 = (6)
A4 = (8)

R = {(1,1), (2, 2), (3,3), (4,4), (5, 5), (6, 6), (7,7), (8, 8), (1, 3), (3, 1), (1, 5), (1, 5), (5,1), (3,5), (5,3), (2, 4), (4, 2), (4, 7), (7,4), (2, 7), (7, 2)}

-> Relation is Reflexive, Symmetric and Transitive

<u>Theorem</u>: Every partition of a set is associated uniquely with an equivalence relation on that set and vice versa

<u>Partial Order Relation:</u>

A partial order is a reflexive, transitive and anti symmetric relation on a set.

Eg: