Inclusion-Exclusion Principle:

→ Let A & B be any finite sets, then:

$$n(A \cup B) = n(A) + n(B) - n(A \cap B) \rightarrow (i)$$

→ For any finite sets; A, B & C.

$$n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(A \cap C) + n(A \cap B \cap C) \rightarrow (ii)$$

* Group of 80 peoples; 60 likes Eggs & 30 likes fish; find Percentage of peoples like both

$n(E) = 60$

$n(F) = 30$

$n(E \cap F) = ?$

$n(E \cup F) = 80$

$n(E \cup F) = n(E) + n(F) - n(E \cap F)$

$80 = 60 + 30 - n(E \cap F)$.

$10 = n(E \cap F)$.

* 200 students; 50 take math, 140 took economics & 24 took both. How many of them not took any of the course.

$n(M) = 50$

$n(E) = 140$

$n(M \cap E) = 24$

$n(M \cup E) = 50 + 140 - 24$.

$= 166$.

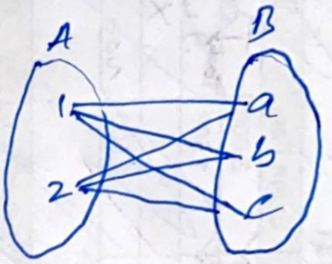
$200 - 166 = 34$

* In a survey of usage of three toothpaste A, B, C. It is found that 60 people likes A, 55 like B, 40 likes C, 20 likes A & B, 35 likes B & C, 15 likes A & C and 10 likes all. Find no. of persons included in the survey?

Relations and their Properties:

→ Relations: Relation is derived from cartesian product of sets i.e:

$A = \{1, 2\}$, $B = \{a, b, c\}$



$A \times B = \{(1,a), (1,b), (1,c),$
$(2,a), (2,b), (2,c)\}$

Cartesian product of A & B.

. Defination: Let A and B be two non-empty sets, then a relation R from A to B is a subset of $A \times B$ (cartesian product).

$\therefore R \subseteq A \times B.$

Example: $A = \{1, 2\}$ and $B = \{1, 2, 3\}$

$R_1 = \{(1,1), (1,3), (2,2), (2,3)\}$

↳ Relation Because.

$R_1 \subseteq A \times B.$

Some important points of relation:

$R_{MAX} = A \times B$, $R_{MIN} = \phi$, ~~Total~~

Binary Relation: A binary relation 'R' from A to B, is a set of ordered pairs where first element is from Set A and second element is from set B.

Example: $A = \{a, b\}$, $B = \{1, 2, 3\}$.

$\overrightarrow{ARB} = \{(a,1), (a,2), (b,3)\}$.