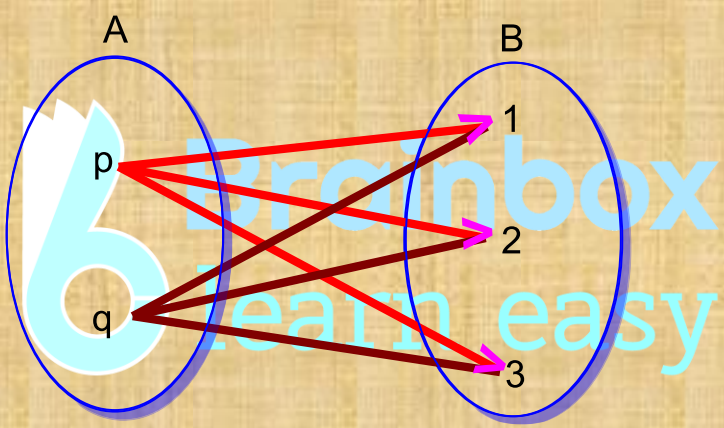
CHAPTER 2
RELATIONS

Cartesian product:

The Cartesian product of two sets A, B is a non – void set of all ordered pairs (a, b) which $a \in A$ and $a \in B$ this is denoted by A x B, read as A cross B.

Let say A = {p, q} and B = {1, 2, 3} and B = {1, 2, 3} then

A x B = {(p, 1), (p, 2), (p, 3), (q, 1), (q, 2), (q, 3)}



Note:

If n(A) = m, n(B) = n, then n (A x B) = mn

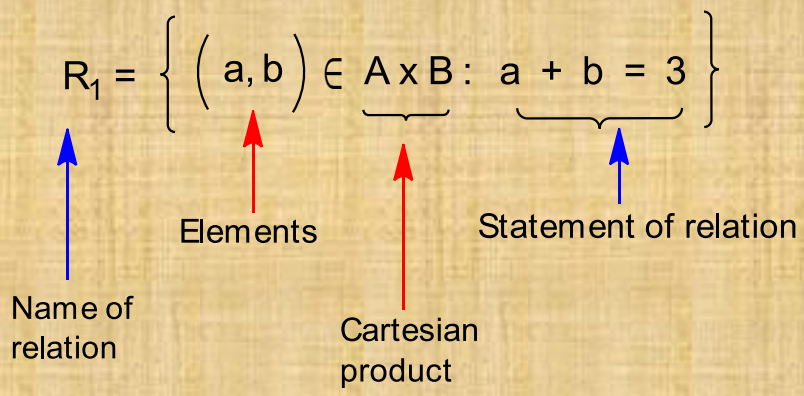
So, we can write Cartesian product A x B = {(a, b) : $a \in A$ and $b \in B$ }

Relation:

Let us consider two sets A = {1, 2, 3} and B = {1, 2, 3}. Then,

A x B = {(1, 1), (1, 2),(1, 3), (2, 1), (2, 2), (2, 3), (3, 1), (3, 2), (3, 3)}

Now we want to define a relation R_1,

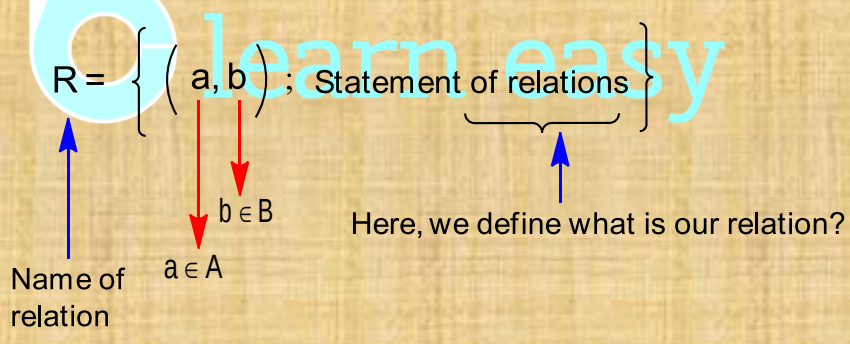


Hence, we have to find these a and b for which a + b = 3.

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

Formal definition of relation:

Let R is a relation from the set A to the set B. We can represent relation R as,



$$R_1 = \{(a,b) \in A \times B : \text{Statement of relation}\}$$

Therefore, always remember,

$$R \subseteq A \times B$$