The Cartesian Product

The Cartesian product (or cross product) of sets A and B, denoted by $A \times B$, is the set defined as

$$A \times B = \{(a, b) | a \in A and b \in B\}.$$

Importantly the elements (a, b) are an *ordered pair* from A and B respectively.

Example

Given two sets A and B

- $A = \{2, 34\}$
- $B = \{4, 5\}$

Compute the Cartesian Producs $A \times B$ and $B \times A$.
Solutions:

$$A \times B = \{(2, 4), (2, 5), (3, 4), (3, 5), (4, 4), (4, 5)\}$$

$$B \times A = \{(4, 2), (4, 3), (4, 4), (5, 2), (5, 3), (5, 4)\}$$