Problem

If A has a elements and B has b elements, how many elements are in A × B? Explain your answer.

Step-by-step solution

Step 1 of 1

$A \times B$ will have $a \times b$ number of elements in it.

One of the method of constructing the Cartesian product is to select an element of $A(x_a)$ and pair it with each and every element of *B:* $B(y_1, y_2 ... y_b)$. This produces the pairings $\{(x_1, y_1), (x_1, y_2), ..., (x_1, y_b)\}$. On repeating this procedure for each remaining element of $A(x_2)$ through x_a.

First pairing will produce $\sum_{i=1}^{n}(x_1, y_1) = a$ pairs. As the iteration continues over the elements of *A*, *a* number of sets will get generated, each set having *b* pairs.

Thus, the number of elements in $A \times B$ is $a \times b.$

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