

The Twelfold Way

How many functions $f : A \rightarrow B$ are there?

Or, how many ways can one place a articles in b boxes?

Elements of A	Elements of B	Arbitrary function	1 – 1 function	Onto function
Distinguishable	Distinguishable			
Indistinguishable	Distinguishable			
Distinguishable	Indistinguishable			
Indistinguishable	Indistinguishable			