

Ques:- find total number of onto map from an n -set to an m -set, where $n=5, m=4$.

Solution:-

$$\text{given } |A| = 5$$

$$|B| = 4.$$

we have to find all onto maps from $A \rightarrow B$.

since we have proved formula in lecture that this number is given by

$$m=5, \quad n=4,$$
$$= \sum_{i=0}^m (-1)^i \binom{m}{i} (m-i)^n$$

$$\text{So}$$
$$= \sum_{i=0}^4 (-1)^i \binom{4}{i} (4-i)^5$$

$$= 4^5 - 4 \times 3^5 + 6 \times 2^5 - 4 \times 1 + 0$$

$$= 1024 - 972 + 6 \times 32 - 4$$

$$= 240.$$