Answer on Question #42808 - Math – Combinatorics |Number Theory

Problem

at movie festival,a team of judges is to pick first, second and third place winners from ten people? how many possibilities are?

Solution

We are choosing 3 persons from 10 people with no repetition. Also, the order matters. That's why we use 'partial permutation' formula.

Partial k-permutations of n are the sequences of k distinct elements selected from a set with n elements. The number of such permutations is given by $\frac{n!}{(n-k)!}$.

Since we need to make a sequence (n_1, n_2, n_3) of the winners (obviously, these people are different), choosing them from the set with n people, the number of possibilities will be $\frac{n!}{(n-k)!} = \frac{10!}{7!} = 8 \cdot 9 \cdot 10 = 720$, as $n = 10, k = 3$.

Answer: 720.