

## Answer on Question #75438 – Math – Discrete Mathematics

### Question

A committee of three is chosen from a group of 20 people. How many different committees are possible, if

- (a) the committee consists of a president, vice president, and treasurer?
- (b) there is no distinction among the three members of the committee?

### Solution

(a) The number of arrangements without repetitions is equal to the number of  $k$ -combinations multiplied by the number of permutations between

$$\text{them } C_n^k \cdot k! = \frac{n!}{k!(n-k)!} \cdot k! = \frac{n!}{(n-k)!}.$$

$$\text{In our case } n = 20; k = 3; \frac{20!}{17!} = 18 \cdot 19 \cdot 20 = 6840.$$

(b) A  $k$ -combination of a set  $S$  is a subset of  $k$  distinct elements of  $S$ . If the set has  $n$  elements, then the number of  $k$ -combinations is equal to

$$\text{the binomial coefficient: } C_n^k = \frac{n!}{k!(n-k)!}.$$

$$\text{In our case } n = 20; k = 3; C_{20}^3 = \frac{20!}{3! \cdot 17!} = \frac{18 \cdot 19 \cdot 20}{6} = 1140.$$

**Answer: (a) 6840; (b) 1140.**