

# Permutations and Combinations Guide Notes

## Permutation

A permutation is an arrangement of objects in a definite order. It is denoted by the symbol  $nPr$  where  $n$  is the total number of objects and  $r$  is the number of objects to be taken at a time in each arrangement.

$$1. nPr = n! \quad (if\ n = r)$$

$$2. nPr = \frac{n!}{(n-r)!} \quad (if\ n < r)$$

$$3. nPr = \frac{n!}{n_1!n_2!\dots n_k!} \quad (n_1, n_2, \dots, n_k \text{ are cells containing objects that are the same kind only.})$$

### Sample Problem 1. Solve Problem involving Permutation.

1. How many possible arrangements can be formed using the letters a, b, c, d and e if the letters are taken:

a. 5 at a time?

b. 3 at a time?

2. How many permutations can be made from the letters of the word DISSIMILAR?

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3. In how many ways can 6 couples be seated in a round table with the men and women alternating?

### Combination

A combination is an arrangement of objects which does not involve the order of selection. The symbol for combination is  $nCr$  where  $n$  is the total number of objects and  $r$  is the number of objects taken at a time in an arrangement. The formula is given by

$$nCr = \frac{n!}{(n-r)!r!}$$

### Sample Problem 2. Solve Problem involving Combination.

4. In how many different ways can a basketball team of 9 members be chosen from the 12 players?

5. In how many ways can 5 physics teacher be selected to attend a convention for free from 8 males and 6 females applicant if the group should be have:

A. 3 men and 2 women

B. 3 or 2 men?