**Combinatorics:**

Permutations:

1. With Repetition (Replacement):

General idea: How many permutations generated by choosing r objects from n **with** replacement?

As each selection has n possibilities there are n \* n \* n \* … \* n permutations

1. Without Repetition:

General idea: How many permutations generated by choosing r objects from n **without** replacement?

* n \* (n-1) \* (n-2) \* … \* (n – r + 1) == nPk

Combinations:

Order does not matter

1. With Replacement:

Strange one to explain

1. Without Replacement:

Consider Drawing 3 objects from 16. Each draw has 3! = 6 permutations but only one combination.

General Idea: How many combinations generated by choosing r objects from n **without** replacement?

Note, the additional r! in the denominator removes the permutations from the enumeration of combinations.

**Some Questions:**

1. How many permutations of 3 **different** digits are there, chosen from the ten digits 0 to 9 inclusive?

10P3 = 720

1. How many permutations of 4 **different** letters are there, chosen from the twenty six letters of the alphabet?

26P4 =

1. How many different committees of 5 people can be chosen from 10 people?
2. How many ways can you split 12 people into 3 teams of 4?