5 Permutations and Combinations

Objectives:

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| Understand the meaning and relevance of the terms permutation and combination |
| Learn to calculate with permutations and calculations |
| Apply permutations and combinations to probability |

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| Content | Teacher's Activity | Student's Activity | Assignments |
| Introduction | * + Review the various approaches to solving probability problems that we have encountered so far   + Explain how permutations and combinations help simplify mathematical computation for some of these scenarios, typically involving more complex calculations that are tedious to perform by hand | * + Understand that permutations and combinations help simplify calculations in certain scenarios   + Understand that permutations and combinations can be used to calculate probability |  |
| 5.1, 5.2 Permutations | * + Introduce the term permutations and explain how it is used for scenarios where the order of arrangement is important   + Deduce the formula for:     - Arranging ***n*** distinct objects in ***n*** positions     - Arranging ***n*** distinct objects in ***r*** positions (*nPr*)     - Arranging ***n*** objects, with repetitions, in ***n*** positions   + Work out Example problems for each problem type | * + Calculate the various possible permutations for the following scenarios:     - ***n*** distinct objects in ***n*** positions     - ***n*** distinct objects in ***r*** positions (*nPr*)     - ***n*** objects, with repetitions, in ***n*** positions | * + Ex 5A |
| 5.3 Combinations | * + Introduce the term combinations and explain how it used for scenarios where the order of arrangement is ***not*** important   + Deduce the formula for *nCr* from *nPr*   + Work out Example problems for combinations using the formula for scenarios with replacement and without replacement | * + Understand the difference between permutations and combinations   + Calculate the various possible combinations using the nCr formula | * + Ex 5B |
| 5.4 Probability and other non-trivial examples using permutations and combinations | * + Work out examples showing scenarios where permutations and combinations can be used to simplify probability calculations   + Work out non-trivial examples where direct application of formula is not possible and a combination of approaches (e.g. writing out outcomes by hand, using a tree diagram, other methods learnt in the probability lesson) is required | * + Learn to identify the most appropriate approach to solving a probability/ permutation/ combination problem | * + Ex 5C |
| Assignment (including a Real-life problem) | * + Clear doubts |  |  |