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
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| 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

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| 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

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| 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
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| Assignment (including a Real-life problem) | * + Clear doubts

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