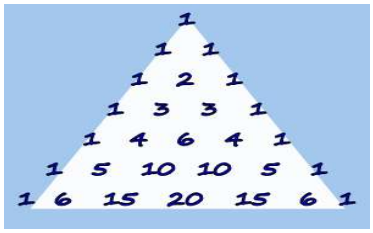
Week 03
Term 1

Learning Brief

MM1:Counting and Probability

Goals



By the end of this week, you should be able to:

- Use combinations to count selections of objects where order is not important
- Use the ${}^{n}C_{r}$ notations to represent selections where order is not important
- Make connections between the number of combinations and the number of permutations.
- Investigate patterns in Pascal's triangle and the relationship to combinations, establish counting principles and use them to solve simple problems involving numerical values for *n* and *r*.
- Use CAS to compute ${}^{n}C_{r}$ for a given n and a given r

Theoretical Components

You will require Chapter 12 of Maths Quest 11 Mathematical Methods 11
Read through Section 12G on Combinations.
Study and make notes on Examples 22 -25.
Make your notes on the following key concepts:

- Combinations
- ${}^{n}C_{r}$

Notes:
http://www.mathsisfun.com/combinatorics/combinations-permutations.html

http://prezi.com/vjvjclbxn8zc/combinations/

How can you use Pascal's Triangle to find combinations or how can you use combinations to find a value in Pascal's Triangle?

http://www.mathsisfun.com/pascals-triangle.html

http://www.mathsisfun.com/data/binomial-distribution.html

$(x+y)^0 = 1$ — 0th row

$(x+y)^1 = 1x + 1y$ — 1st row

$(x+y)^2 = 1x^2 + 2xy + 1y^2$ — 2nd row

$(x+y)^3 = 1x^3 + 3x^2y + 3xy^2 + 1y^2$ — 3rd row

$(x+y)^4 = 1x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + 1y^4$ — 4th row

$(x+y)^5 = 1x^5 + 5x^4y + 10x^3y^2 + 10x^2y^3 + 5xy^4 + 1y^5$ — 5th row

Practical Components

You will require Chapter 12 of Maths Quest 11 Mathematical Methods (pdf Google Drive)
Do the following questions

EX 12G: ALL the odd numbered questions.

Write the nth row of Pascal's Triangle using ${}^{n}C_{r}$ notation. Expand $(x+y)^n$

There is a task on www.mathspace.co for you to complete.

Investigation

1. How many 10-card hands containing exactly 7 hearts and 3 spades are possible from a standard 52-card deck?
2. To win LottoMania, the 5 numbers entered on the player's entry ticket must be the same as 5 numbers that are randomly selected from the numbers 1 to 30.
   (i) How many different entries are possible?
   (ii) What is the percentage increase in the number of possible combinations if the numbers are randomly selected from the numbers 1 to 35?
3. A basketball squad of 10 must be chosen from a group of 8 women and 6 men. How many squads are possible:
   1. without restriction?
   2. if the squad contains 6 women and 4 men?
   3. if the squad must contain at least 6 women?
   4. If the squad contains all of the men?

QFO

Quiz/Forum/Other