

## 1. Goals



By the end of this unit, students:

- understand the concepts and techniques in combinatorics, geometry and vectors
- apply reasoning skills and solve problems in combinatorics, geometry and vectors
- communicate their arguments and strategies when solving problems
- construct proofs in a variety of contexts including algebraic and geometric
- interpret mathematical information and ascertain the reasonableness of their solutions to problems.

This week's focus:

- Permutations and Combinations (with and without restrictions)

## 2. Theoretical Components

Readings:

Read examples: ABOUT/RESOURCES/SEM1/WK11

Brief notes and examples: <https://goo.gl/C2CTrJ>

Permutations and Combinations:  
<https://goo.gl/6iAlZA>

Watch videos with examples:

Permutations with restrictions: items not together:  
<https://goo.gl/RDOlkW>

Permutations where items are restricted to the ends:  
<https://goo.gl/NLqXsj>

Combinations, what are they and the nCr function:  
<https://goo.gl/vBBlvk>

Combinations - Further methods:  
<https://goo.gl/iZDCiE>

## 3. Practical Components

Attempt all the questions on WK11 pdf on google classroom:

ABOUT/RESOURCES/SEM1/WK11

Do as many: <https://bit.ly/3dtDo89>

## 4. Investigation

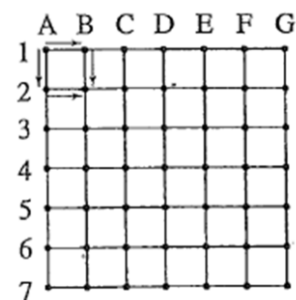
A: Messi and CR7 enter a maze. They have been given a compass. To prevent themselves from going around in circles they decide that they will only travel south or east and never north or west.

Messi and CR7 enter the maze at A1.

How many different ways can they travel to get to:

i) D6 ii) E5 iii) G7

Show working.



B: Give an example that demonstrates that:

$$\binom{5}{0} \times \binom{6}{4} + \binom{5}{1} \times \binom{6}{3} + \dots + \binom{5}{4} \times \binom{6}{0} = \binom{11}{4}$$

20 marks

## 5. QFO

Quiz/Forum/Other

WK11 Research:

Do your research on Pascals triangle. Describe a pattern. You may back your description with an example.