

Goals



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

- Understand the fundamentals of probability (review)
- Define experiment, outcome, event, probability and equally likely.
- Recognise the difference between outcomes that are equally likely and not equally likely to occur.
- Determine the probability of simple and compound events
- Use tree diagrams to determine the sample space of compound events
- Use Venn diagrams to determine the probability of compound events
- Use Karnaugh Maps to determine the sample space of compound events
- Use addition principle to compute probabilities of mutually exclusive (and non-mutually exclusive or inclusive) events.

Theoretical Components

Review of the fundamentals of probability:

- review probability as a measure of ‘the likelihood of occurrence’ of an event
- review the probability scale: $0 \leq P(A) \leq 1$ for each event A , with $P(A) = 0$ if A is an impossibility and $P(A) = 1$ if A is a certainty
- review the rules: $P(A') = 1 - P(A)$ and $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

Read through Section 12H on Applications to Probability (pdf Google Drive)

Study and make notes on Examples 26 -29.

Watch these videos:

https://www.khanacademy.org/math/probability/probability-and-combinatorics-topic/probability_combinatorics/v/events-and-outcomes-3

https://www.khanacademy.org/math/probability/probability-and-combinatorics-topic/probability_combinatorics/v/getting-exactly-two-heads-combinatorics

https://www.khanacademy.org/math/probability/probability-and-combinatorics-topic/probability_combinatorics/v/probability-using-combinations

Practical Components

There are four tasks on mathspace.co for you to complete for this brief:

- Mixed Questions on Probability
- Probability using Venn Diagrams
- Law of Total Probability
- Pascal’s Triangle – Revisited (have another go for practice)

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

- Ex 11C: All even numbers
- EX 11D: All odd numbers
- EX 11E: 5, 8, 10, 12-16
- EX 12H: Questions 1-21

Investigation

See the following page.

Remember to scan in when you come to Maths and when you leave.

See Jacqueline if you have any concerns.

QFO

Quiz/Forum/Other

In **Week 6** you are to sit an **In-Class Task** worth 20% (with your weekly investigations) in your double line 1 or 6. It is an “**open book**” task given under test conditions. You will be allowed to bring in any of your notes and worked exercises since Week 1 and, of course, your calculator.



INVESTIGATION WEEK 5&6

Task 1

The purpose of this investigation is to find a rule for calculating $P(A \text{ and } B)$ for two events A and B that are independent. Suppose a coin is tossed and a die is rolled at the same time. The result of the coin toss will be called outcome A , and the result of the die roll will be outcome B . Draw up a **tree diagram** to show all the outcomes possible.

i. Copy and complete the table:

	$P(A \text{ and } B)$	$P(A)$	$P(B)$
$P(\text{a head and a } 4)$			
$P(\text{a head and an odd number})$			
$P(\text{a tail and a number larger than } 1)$			
$P(\text{a tail and a number less than } 3)$			

ii. What is the connection between $P(A \text{ and } B)$, $P(A)$, and $P(B)$?

Task 2

1. Ten people randomly seat themselves about a circular table. What is the probability that 4 particular people will be sitting next to each other?

2. A committee of 4 people is to be formed by choosing members from a group of 6 men and 4 women. What is the probability that the committee will consist of 2 men and 2 women?

3. Of 50 people surveyed, 35 played tennis and 26 played netball. Everyone surveyed played at least one of these sports.

a How many people played both netball and tennis?

b If one person is selected at random, what is the probability that:

i he/she plays tennis only?

ii he/she plays netball?

iii he/she plays tennis, given that he/she also plays netball?

(Use a Venn Diagram)

4. What is the probability of getting exactly 50 heads on 100 flips of a coin?