

1. Goals



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

- 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 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
- use relative frequencies obtained from data as point estimates of probabilities

2. Theoretical Components

Knowledge checklist

- 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 the addition principle to compute probabilities of mutually exclusive (and non-mutually exclusive or inclusive) events

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

Online reading

<https://mathspace.co/textbook/subtopic/246527/lessons>

3. Practical Components

Chapter 11 of **Maths Quest 11 Mathematical Methods** (pdf - Google Classroom). Make notes as needed then complete the following questions.

11C Tree diagrams and lattice diagrams

- Q's 1, 3, 7, 11, 15, 17, 22

11D The Addition Law of Probabilities

- Q's 1, 3, 5, 11, 13, 15, 20, 24

11E Karnaugh maps and probability tables

- Q's 1(a,c), 5, 7, 8, 10, 12, 13, 15

4. Investigation

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 .

a) Draw up a **tree diagram** to show all the outcomes possible.

b) Copy and complete the table:

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

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

(20 marks – see rubric)