

Exercise walk-through

C8.1

Introduction to probability

IGCSE Mathematics

You must be able to

- Use favourable outcomes over equally likely outcomes
- Express probabilities as fractions, decimals or percentages
- Use complements and identify impossible or certain events

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The method

Method — Key knowledge: Introduction to probability

Probability is between 0 and 1: impossible is 0, certain is 1, equally likely to happen or not is $1/2$. With equally likely outcomes, probability is favourable outcomes divided by total outcomes. For an event not happening, subtract its probability from 1. Fractions, decimals and percentages can express the same probability. Counts from a two-way table or two-set Venn diagram can supply the numerator and denominator.

Exercises 2.1·2.3

2.1 Give the probabilities of an impossible event and a certain event. [2]

2.2 A fair die is rolled. Find the probability of an even number. [2]

2.3 The probability of rain is 0.35. Find the probability of no rain. [2]

Exercises 2.1·2.3

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2.1

- On the scale: **0** and **1**, respectively.
-

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2.2

- Even outcomes are 2, 4, 6: $p = 3/6 = \mathbf{1/2}$.
-

2.3 The probability of rain is 0.35. Find the probability of no rain. [2]

2.3

- $q = 1 - p = 1 - 0.35 = \mathbf{0.65}$.

Exercise 2.4

2.4 A bag has 6 green and 9 white counters. Find the probability of green as a fraction and percentage. [2]

3 Exam-style questions

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3 Exam-style questions

2.4

- $p = 6/15 = \mathbf{2/5}$; $p = \mathbf{40\%}$.

Exercise 3.1 (a)

3.1 Apply the introduction to probability methods below. Show working and include units where appropriate.

(a) Of 30 students, 14 play chess, 11 play tennis and 5 play both. Find the number playing at least one. [2]

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(a)

- $N = 14 + 11 - 5 = \mathbf{20}.$

Exercise 3.1 (b)

3.1 Apply the introduction to probability methods below. Show working and include units where appropriate.

(b) Choose one student at random. Find the probability they play neither. [2]

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(b) Choose one student at random. Find the probability they play neither. [2]

(b)

- Neither count $n = 30 - 20 = 10$; $p = 10/30 = \mathbf{1/3}$.

Exercise 3.1 (c)

3.1 Apply the introduction to probability methods below. Show working and include units where appropriate.

(c) Find the probability they play exactly one of the games. [2]

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(c)

- Exactly one count $n = (14 - 5) + (11 - 5) = 15$; $p = 15/30 = \mathbf{1/2}$.

Exercise 3.2 (a)

3.2 Cards numbered 1 to 20 are shuffled and one card is drawn at random.

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(a)

- The multiples are **3, 6, 9, 12, 15, 18**.
- $p = 6/20 = \mathbf{3/10}$.
- Complement $q = 1 - p = \mathbf{7/10}$.

Exercise 3.2 (b)

3.2 Cards numbered 1 to 20 are shuffled and one card is drawn at random.

(b) Find the probability of drawing a number that is a multiple of 3 or 5. Explain why adding the separate counts without adjustment is wrong. [3]

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(b) Find the probability of drawing a number that is a multiple of 3 or 5. Explain why adding the separate counts without adjustment is wrong. [3]

(b)

- There are 6 multiples of 3 and 4 of 5, with **15 counted twice**.
- Favourable count $n = 6 + 4 - 1 = 9$, so $p = 9/20 = \mathbf{0.45}$.