

The Panda Math Tutor

www.thepandamathtutor.com

Probability

IGCSE Mathematics

Prepared by

Nikolas Agisilaou

Contents

1	Introduction	2
2	Key Definitions	2
3	Theoretical Probability	4
4	Experimental (Relative Frequency) Probability	5
5	Expected Frequency	7
6	Complementary Events	8
7	Mutually Exclusive Events and the Addition Rule	9
8	Independent Events and the Multiplication Rule	10
9	Sample Space Diagrams	12
10	Tree Diagrams	14
11	Venn Diagrams and Set Notation	16
12	Conditional Probability	18
13	Key Rules and Formulas Summary	20
14	Summary and Exam Tips	21

1 Introduction

Note

Probability is one of the most widely applicable topics in IGCSE Mathematics. It deals with how likely events are to occur and is used in everyday contexts such as weather forecasting, games, insurance, medical testing, and risk assessment.

In this chapter, we will explore:

- The language and key definitions of probability
- The probability scale and basic probability
- Theoretical probability and experimental probability
- Expected frequency
- Mutually exclusive events and the Addition Rule
- Independent events and the Multiplication Rule
- Complementary events
- Sample space diagrams
- Tree diagrams
- Venn diagrams and set notation for probability
- Conditional probability (basic)

2 Key Definitions

Definition

A **trial** (or **experiment**) is a single performance of a well-defined process whose outcome is uncertain. For example, rolling a die once, flipping a coin, or drawing a card from a deck.

Definition

An **outcome** is a single possible result of a trial. For example, when rolling a standard die, the possible outcomes are 1, 2, 3, 4, 5, 6.

Definition

An **event** is a specific outcome or a **set of outcomes** that we are interested in. Events are usually denoted by capital letters such as A , B , C . For example, “rolling an even number” is the event $\{2, 4, 6\}$.

Definition

The **sample space** (denoted S or ξ) is the complete set of **all possible outcomes** of a trial. For a standard die: $S = \{1, 2, 3, 4, 5, 6\}$.

Definition

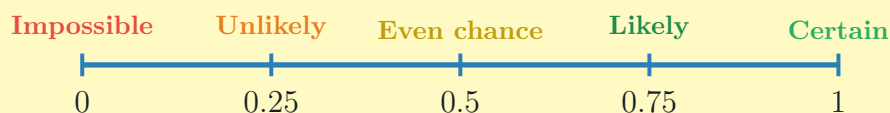
The **probability** of an event is a numerical measure of how likely that event is to occur. It is written as $P(A)$ and always satisfies:

$$0 \leq P(A) \leq 1$$

Note

Understanding the probability scale:

- $P(A) = 0$ means the event is **impossible** — it can never happen
- $P(A) = 1$ means the event is **certain** — it will definitely happen
- $P(A) = 0.5$ means the event is **equally likely** to happen or not happen
- The closer $P(A)$ is to 1, the more likely the event; the closer to 0, the less likely

**Warning**

Probabilities are always between 0 and 1 (inclusive).

A probability can be expressed as a **fraction**, a **decimal**, or a **percentage**. If your answer is negative or greater than 1, you have made an error.

Preview ends here

20 more pages are in the full pack.

Probability — Main Notes — €9.99

Buy the pack and the complete PDF lands in your inbox.

Personal study use only — please don't resell or share.