

Probability

Cambridge IGCSE Maths (0580) · Knowledge organiser

KEY DEFINITIONS

Probability

How likely an event is, from 0 (impossible) to 1 (certain).

Relative frequency

The fraction of trials in which an outcome happened; an estimate of its probability.

Mutually exclusive

Events that cannot happen at the same time.

Independent events

One does not affect the other, so $P(A \text{ and } B) = P(A) \times P(B)$.

YOU SHOULD BE ABLE TO...

- Use the probability scale, calculate probabilities of single events and use $P(\text{not } A) = 1 - P(A)$ to find missing probabilities.
- Estimate probabilities using relative frequency from experiments and calculate expected frequencies for a given number of trials.
- Find probabilities of combined events using sample space diagrams and Venn diagrams, including probabilities of unions and intersections.
- Draw tree diagrams for combined events with and without replacement, and use them to calculate probabilities.
- Calculate conditional probabilities from Venn diagrams, two-way tables and tree diagrams, such as the probability of A given that B has happened.
- Calculate conditional probabilities from two-way tables, such as the probability that a student studies French given that they are in Year 11.

COMMON MISTAKES

- ✗ Combined events: adding where you should multiply
- ✗ Adding probabilities along a tree-diagram branch instead of multiplying

KEY FORMULAS

Probability	$P(\text{not } A) = 1 - P(A)$; expected frequency = $n \times P(A)$
Relative frequency	$\frac{\text{frequency of the outcome}}{\text{number of trials}}$
Mutually exclusive	$P(A \text{ or } B) = P(A) + P(B)$
Independent	$P(A \text{ and } B) = P(A) \times P(B)$
Conditional	$P(A B) = \frac{P(A \cap B)}{P(B)}$
Tree diagrams: multiply along branches, add the outcomes you want	
Without replacement: the second-branch probabilities change (one fewer item)	

WORKED EXAMPLE

A bag has 4 red and 6 blue beads. Two are taken without replacement. Find the probability that both are red.

1. $P(\text{first red}) = 4/10$
2. $P(\text{second red, given the first was red}) = 3/9$
3. Multiply along the branch: $4/10 \times 3/9 = 12/90$

Answer: 2/15