Year 8 Probability – Revision Notes

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Year 8 · Maths · Probability · Key ideas and worked examples

For grown-ups and learners: read each part and try the worked example. Then work through the sheets: Foundation, Developing, Challenge, then Mixed Practice to revise everything. Show your working: it earns marks in tests and helps you spot mistakes.

1. Complementary events

An event and its **complement** (the event not happening) have probabilities that add up to 1. If P(rain) = 0.35, then P(no rain) = 1 − 0.35 = **0.65**.

Example: The probability that a team wins its next match is 1/6. What is the probability that the team does not win?
→ The event and its complement have probabilities that add up to 1
→ 1 − 1/6 = 5/6
Answer: 5/6

2. Combined events

When two things happen together, such as flipping a coin and rolling a dice, list the outcomes systematically or use a **sample space diagram** (a table). A coin and a six-sided dice give 2 × 6 = **12** equally likely outcomes: H1, H2, ..., T6. Two dice give 6 × 6 = 36 outcomes.

Example: A coin is flipped and a fair 4-sided dice (1 to 4) is rolled. List all the possible outcomes, using H for heads and T for tails.
→ Heads with each number: H1, H2, H3, H4
→ Tails with each number: T1, T2, T3, T4
Answer: H1, H2, H3, H4, T1, T2, T3, T4

3. Theoretical probability

When all the outcomes are equally likely, P(event) = number of successful outcomes ÷ total number of outcomes. For two dice, a total of 10 comes from (4, 6), (5, 5) and (6, 4), so P(total 10) = 3/36 = **1/12**.

Example: Two fair four-sided dice are rolled. Use a sample space diagram to find the probability that the total is 4. Give your answer as a fraction in its simplest form.
→ A 4 × 4 grid gives 16 equally likely outcomes; 3 of them work
→ P = 3/16 = 3/16
Answer: 3/16

4. Experiment and theory

In an experiment, experimental probability = number of successes ÷ number of trials. The **expected** number of successes is the theoretical probability × the number of trials: with a fair dice rolled 300 times, expect 1/6 × 300 = 50 sixes. With many trials, results that are far from what you expect suggest the dice may be biased.

Think like a mathematician: test a few cases (**specialising**), look for the rule that always works (**generalising**), and explain why you are sure (**convincing**). When you check someone's working, say what is wrong and how to **improve** it.

Common mistakes: forgetting that HT and TH are different outcomes. Thinking all totals of two dice are equally likely. Probabilities of complementary events that do not add up to 1.