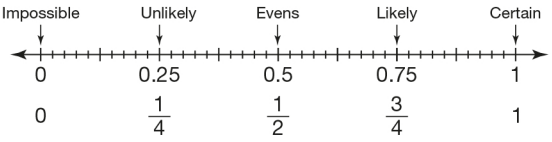
Probability

The basics of probability

The probability scale

The probability scale goes from 0 to 1. Probabilities can be expressed as decimals or fractions.



NAILIT!

Unbiased or **fair** means that all the outcomes are equally likely. The opposite is **biased**, where certain outcomes would be more likely than others.

The probability formula

If all the outcomes are equally likely to happen:

$$\text{Probability} = \frac{\text{number of ways something can happen}}{\text{total number of possible outcomes}}$$

WORKIT!

Find the probability of throwing an even number on an unbiased dice.

Number of even numbers = 3 (2, 4 and 6).

Total number of numbers = 6.

$$\text{Probability} = \frac{\text{number of ways something can happen}}{\text{total number of possible outcomes}} = \frac{3}{6} = \frac{1}{2}$$

Always cancel fractions, as otherwise you may lose marks.

The sum of probabilities

Suppose the probability that it rains tomorrow is $\frac{5}{8}$, then the probability that it does not rain tomorrow is $\frac{3}{8}$. When only one result can happen at a time the probabilities add up to 1:

$$\text{P(event occurs)} + \text{P(event does not occur)} = 1$$

If there are three possible probabilities, A, B and C, and only one can occur at once:

$$\text{P}(A) + \text{P}(B) + \text{P}(C) = 1$$

WORKIT!

A box contains coloured balls that are red, blue or green.

The table shows the number of balls of each colour.

	Red	Blue	Green
Number of balls	$2x + 1$	7	$x + 2$

A ball is chosen at random. The probability of the ball being blue is $\frac{7}{25}$.

Calculate the probability of choosing a red ball.

There are only red, blue and green balls in the bag, so the total probability must add up to 1.