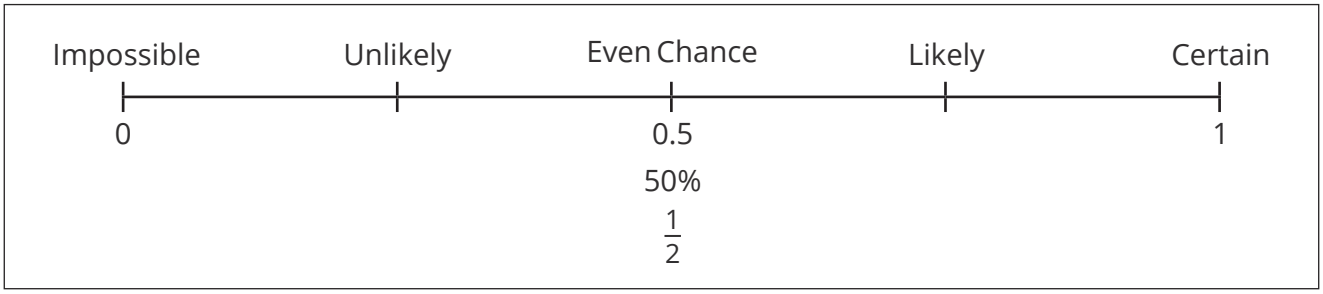
Introduction to Probability

Probability measures how likely an event is to happen. Probabilities can be described in words. They can also be described using fractions and decimals between 0 and 1 or percentages between 0 and 100%. We never use ratios to represent a probability!

The Probability Scale

If an event is impossible, its probability is 0. If it is certain then its probability is 1 or 100%. The probability scale includes all the options between these two events.



Writing Probabilities

The probability of an event occurring is:

$$\frac{\text{the number of ways the event can occur}}{\text{the total number of outcomes}}$$

Example 1:

A fair six-sided dice is thrown. What is the probability that the score is 5?

The dice has six faces numbered 1 to 6 inclusive. This means that there is only ***one*** way that a score of 5 can occur and the ***total*** number of outcomes is six. We can use **P( )** to represent the probability of something occurring.

P(scoring a 5) = $\frac{1}{6}$

Probability of an Event Not Occurring

If events cannot occur together, we say that they are ***mutually exclusive***. If this is the case, we say that the sum of the probabilities is 1.

Example 2:

The probability that a goldfish measures less than 4cm is 0.7. What is the probability that a goldfish measures 4cm or more?

P(goldfish measures 4cm or more) = 1 – 0.7 = 0.3

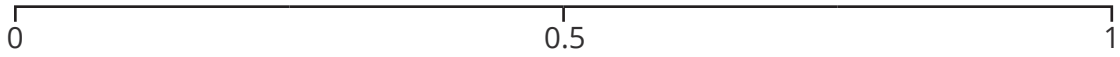
as the sum of the probabilities has to be 1.

Your Turn

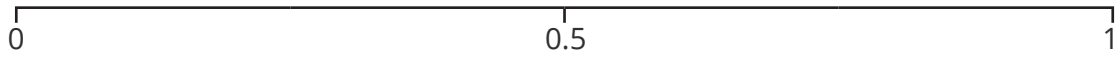
1. Match up the events with the likelihood of them occurring.

A fair coin will land on heads when thrown.	Unlikely
Christmas Day will be on 25th December.	Even Chance
You will walk on the moon today.	Certain
You will be struck by lightning this week.	Likely
You choose a red counter from a bag that just contains 6 red counters and 1 blue counter.	Impossible

2. A fair three-sided spinner is marked with the numbers 1, 2 and 3. The spinner is spun. Mark on the probability scale the probability that the spinner lands on 3.



3. A bag contains 4 blue counters and 1 red counter. A counter is drawn at random. Mark on the probability scale the probability that the counter is red.



4. A fair six-sided dice is thrown. What is the probability that the dice lands on an even number? Give your answer as a fraction in its simplest form.

5. In a class of 30 students, 7 students only have a cat and 8 students only have a dog. A student is chosen at random. What is the probability that the student only has a cat?

6. A bag contains 4 blue counters, 5 red counters and 1 green counter. A counter is chosen at random. Find the probability that the counter is blue, giving your answer as a decimal.

7. In a group of men, the probability that a man is taller than 1.85m is 0.03. What is the probability that a man chosen at random is not taller than 1.85m?

8. A bead is chosen at random from a bag. The probability of choosing a red bead is $\frac{1}{5}$. What is the probability of choosing a bead that is not red?

9. A bag of sweets contains toffees, gummies and sherbet lemons only. A sweet is chosen at random. The probability of choosing a toffee is 0.3 and the probability of choosing a gummy is 0.25. What is the probability of choosing a sherbet lemon?

10. A spinner is spun. It can land on 1, 2, 3 or 4. The table shows the probabilities of the spinner landing on each number. Fill in the missing value.

Number	1	2	3	4
Probability	0.2	0.15		0.4

Challenge:

A bag contains red, blue and green counters only. A counter is chosen at random. The probability of choosing a red counter is 0.4. The probability of choosing a blue counter is double the probability of choosing a green counter. Work out the probability of choosing a blue counter.