

Extension & Challenge — Probability

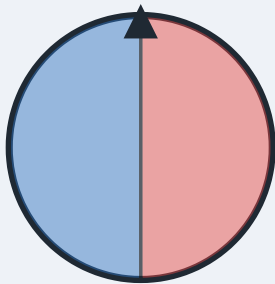
Part A — Spinners & Probability

Part A — Spinners & Probability

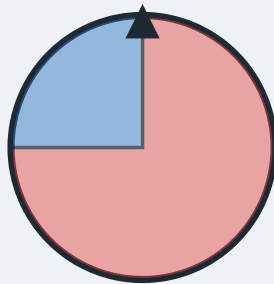
The probability of an event is the fraction of outcomes that are favourable. For a spinner, compare the size of the coloured region to the whole circle.

Worked example. A spinner is half red and half blue. The red region is $\frac{1}{2}$ of the circle, so $P(\text{red}) = \frac{1}{2}$. The chance of *not* red is also $\frac{1}{2}$, because the two add to 1.

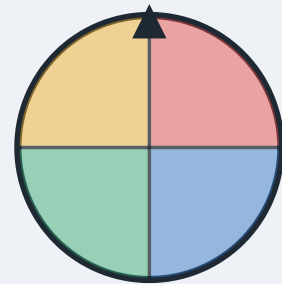
Spinners — what is the chance of red?



A



B



C

Spinners A, B and C.

1 Write the probability of landing on **red** for each spinner, as a fraction.

A: _____ B: _____ C: _____

2 Order the three spinners from the **least** to the **greatest** chance of red.

3 On spinner C (four equal colours), what is the probability of landing on red *or* blue?

Answer: _____

4 On spinner B, what is the probability of **not** landing on red? Explain how this links to your answer for spinner B in question 1.

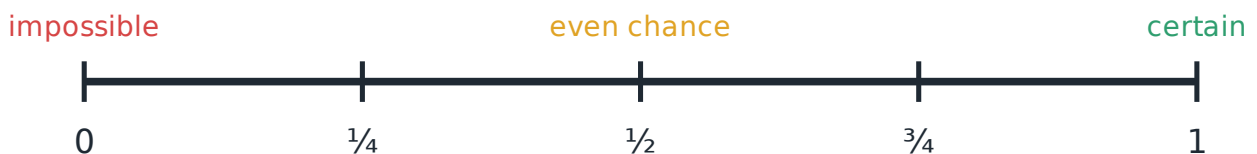
5 If you spin spinner A 100 times, about how many reds would you expect? Why is the real result unlikely to be exactly that?

6 **Design it.** Draw and shade a spinner where the probability of red is exactly $\frac{1}{3}$.

Part B — The Probability Scale

Every probability sits between 0 (impossible) and 1 (certain). An even chance sits at $\frac{1}{2}$. The probabilities of an event happening and not happening always add to 1.

Place each event on the scale



The probability scale, from impossible (0) to certain (1).

If $P(\text{event}) = p$, then $P(\text{not event}) = 1 - p$. This is called the complement.

1 On the scale above, write the words *impossible*, *even chance* and *certain* in the correct places (0, $\frac{1}{2}$ and 1).

2 Mark each event on the probability scale with its letter.

A. R: rolling a 7 on an ordinary 6-sided die

B. H: a fair coin landing on heads

C. S: the sun rising tomorrow

D. E: rolling an even number on a die

E. L: rolling a number less than 6 on a die

3 The probability of an event is $\frac{1}{4}$. What is the probability that it does **not** happen?

Answer: _____

4 A bag holds 3 red marbles and 1 blue marble. Write $P(\text{red})$ and $P(\text{blue})$.

$P(\text{red}) =$ _____ $P(\text{blue}) =$ _____

5 **Theory vs experiment.** Jin tosses a fair coin 10 times and gets 7 heads. Does this mean the coin is unfair? Explain.

6 **Open challenge.** Describe a real event whose probability is close to, but not exactly, 1 (very likely but not certain).