

**WORKIT!**

A bag contains 8 red balls, 1 green ball and 11 blue balls. Timothy takes one ball from the bag without looking.

- a Write down the probability that he takes a green ball. Give your answer as a fraction.

$$P(\text{green}) = \frac{1}{20}$$

There is 1 successful outcome since there is 1 green ball.

There are 20 possible outcomes since there are 20 balls in the bag.

- b Timothy says there is an 11% chance he takes a blue ball. Is he correct? Explain your answer.

No, he is not correct - the number of blue balls in the bag is more than half the balls, therefore the probability will be greater than  $\frac{1}{2}$ .

The actual probability of choosing a blue ball is:

$$P(\text{blue}) = \frac{11}{20}$$

Convert this to a percentage.

$$\frac{11}{20} = \frac{55}{100} = 55\%$$

If you have to explain your answer you should give a mathematical reason or calculation with your answer.

**Mutually exclusive events**

Two events are mutually exclusive if they cannot happen at the same time. For example, rolling a 1 and rolling a 6 on a dice.

If you list all the possible outcomes of an event and they are all mutually exclusive, then the sum of their probabilities is 1.



Look at the spinner. The possible outcomes are red, blue and yellow, which are all mutually exclusive. You can display the outcomes and their probabilities in a table.

Outcomes	Red	Yellow	Blue
Probability	$\frac{1}{6}$	$\frac{1}{2}$	$\frac{1}{3}$

The sum of the probabilities =  $\frac{1}{6} + \frac{1}{2} + \frac{1}{3}$

If they all add up to 1, you know you have covered all possibilities.

$$= \frac{1}{6} + \frac{3}{6} + \frac{2}{6} = 1$$

Convert the fractions so that they all have the same denominator.

**DO IT!**

Write down an example of a pair of events that are mutually exclusive.

**WORKIT!**

A box contains milk, dark and white chocolates wrapped in foil paper.

The probability of picking a milk chocolate is 0.3.

The probability of picking a dark chocolate is 0.1.

Calculate the probability of choosing a white chocolate.

$$P(\text{white}) = 1 - (0.3 + 0.1)$$

$$= 1 - 0.4$$

$$= 0.6$$

Since the events are mutually exclusive and the only possible outcomes are choosing a milk, dark or white chocolate, the probabilities sum to 1.

Probability of choosing a white chocolate = 0.6