$$P(\text{blue}) = \frac{\text{number of blue balls}}{\text{total number of balls}} = \frac{7}{25}$$

So total number of balls $= 25$

$2x + 1 + 7 + x + 2 = 25$

$3x + 10 = 25$

$3x = 15$

$x = 5$

Number of red balls $= 2x + 1 = 2 \times 5 + 1 = 11$

Probability of choosing a red ball $= \frac{11}{25}$

Add up the number of balls to create an equation.

Use the calculated value of x to work out the number of red balls.

Sample space

In order to work out probability you need to be able to work out **outcomes**. The outcomes are the different possible combinations of what could happen. For example, when you toss two coins the possible outcomes are (HH, HT, TH and TT). You can use a **sample space** to show all the possible outcomes.

WORKIT!

A fair dice is rolled and a fair triangular spinner is spun. The scores are added together.

a Produce a sample space showing all the possible outcomes.

The outcomes are all the different ways of throwing the dice and spinning the spinner.

Dice \ Spinner	1	2	3
1	2	3	4
2	3	4	5
3	4	5	6
4	5	6	7
5	6	7	8
6	7	8	9

The first column shows the score on the dice and the first row the score on the spinner.

The total scores are then filled in.

b Write down the total number of outcomes.

Total number of outcomes $= 18$

The number of outcomes is the number of totals in the sample space diagram.

c Find the probability of obtaining a total score of 7.

$$P(7) = \frac{\text{number of ways of scoring 7}}{\text{total number of outcomes}} = \frac{3}{18} = \frac{1}{6}$$

The dice and spinner are both fair, so all the outcomes are equally likely.

You can work out the total number of outcomes using the formula:

Total number of outcomes = number of ways each action can be carried out, multiplied together

For the example above, total number of outcomes = number of dice outcomes × number of spinner outcomes: $6 \times 3 = 18$.

NAILIT!

An event is an outcome or group of outcomes you are interested in, such as 'it rains tomorrow' or 'it rains on Saturday and is fine on Sunday'.