# Chance and probability

- Recognising certain and impossible outcomes and stating their probabilities
- Calculating the probability of an event for equally likely outcomes
- Understanding that random processes are unpredictable

Keywords

You should know

explanation 1a explanation 1b online

**1** Write down the probability of each event.

**a** The sun will set tomorrow.

**b** You will have only one birthday next year.

**c** Tomorrow will be Sunday.

**2** Describe an event with each probability.

**a** The event is impossible.

**b** The event has an even chance of happening.

**c** The event is certain to happen.

**3** **a** List all the outcomes when rolling a fair six-sided dice.

**b** Are these outcomes equally likely?

**c** Explain your answer to part **b**.

**4** **a** What is probability of rolling a six with the dice in question **3**?

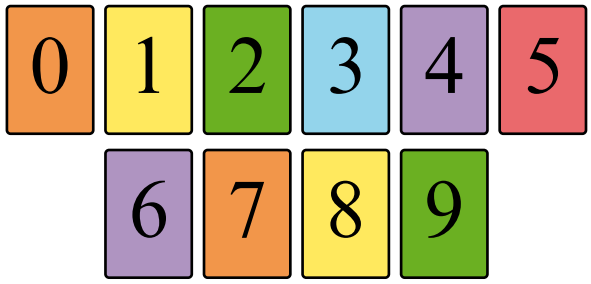
**b** If you rolled the dice six times, how many sixes would you expect?

**c** If you rolled the dice sixty times, how many sixes would you expect?

**d** Are you guaranteed to get exactly the number of sixes you expected?

**e** Give a reason for your answer to part **d**.

**5** A card game uses a set of ten different digit cards.




**a** A card is chosen at random. How many possible outcomes are there?

**b** What is the probability that the card chosen shows an odd number?

**c** What is the probability that the card chosen shows a prime number?

**d** What is the probability of choosing a card that shows a multiple of 8?

**e** What is the probability of choosing a card that shows a factor of 36?

**6** A class chooses their school council rep by writing the name of every member of the class on a piece of paper, putting the pieces of paper into a box and then drawing out one name. There are 14 girls and 15 boys in the class.

**a** How many possible outcomes are there?

**b** What is the probability that a boy will be chosen as the rep?

**c** Anna was the rep last term. What is the probability she will be chosen again?

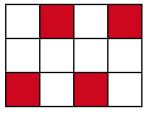
**d** Do you think this is a good way to choose a rep from the class?

**7** Three different scratch cards, A, B and C, all have some shaded squares as shown below. All 12 squares on each card are hidden, and you may reveal just one square on each card.

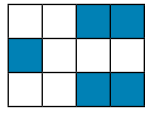
**a** On which card are you most likely to reveal a hidden shaded square?

**b** Explain your answer to part **a**.

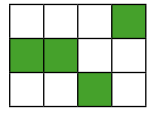
A



B



C



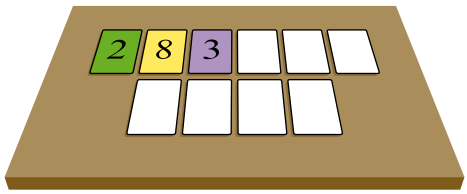
**8** Design your own set of three scratch cards and state which one you should choose to increase your chance of success.

**9** Sarah has thrown a head eight times in a row with her 10p coin and predicts that she will throw a head again next time.

**a** Do you think she is right?

**b** Is there enough evidence to say that the coin is biased?

**10** Work with a partner.




Take a set of ten different digit cards, shuffle them and lay them face down in a line.

The first player turns over the first card.

Before the second player turns over the second card both write down whether you think this card will be higher or lower than the first card, giving a reason for your answer. You get a point for a correct prediction.

Taking turns, continue in the same way with the rest of the cards.

A rich Frenchman, the Chevalier de Mere, played a gambling game in which he bet that he could throw a six in four throws of a dice. He also bet that with two dice he could throw a double six in 24 throws.

He invited the philosopher and mathematician Blaise Pascal to work out the true probabilities of these outcomes.

Try to find out more about Pascal's work.