Probability

- Finding the probability of an event not occurring
- Using diagrams to record all possible outcomes for a single event
- Using diagrams to record all possible outcomes for two successive events

Keywords

You should know

explanation 1

1 A bag contains two red counters, three blue counters and three green counters. A counter is taken out of the bag at random.

a Find, as a fraction, the probability of these outcomes.

i a red counter **ii** a blue counter

iii a green counter **iv** either a red or a blue counter

b Add together your answers for **i**, **ii** and **iii**. Explain your result.

2 A game uses a ten-sided dice, numbered from 1 to 10. Give, as decimals, the probabilities for these events when the dice is rolled.

a a seven

b an even number

c a multiple of three

d a factor of twelve

e a prime number

3 Weather reports sometimes give the likelihood of rain as a percentage. Last Monday the forecaster said the probability of rain on Tuesday was 30%. Write this as a fraction and as a decimal.

4 There are ten counters in a bag. Five are blue, three are red and two are yellow. One counter is taken from the bag at random. Find the probability of selecting each colour. Write the probability as a fraction, a decimal and a percentage.

a red **b** yellow **c** blue

explanation 2a | explanation 2b | online

5 **a** What is the probability of throwing a 6 with a fair six-sided dice?

b What is the probability of throwing a number less than 6?

c Describe two ways in which you could work out the answer to part **b**.

6 A set of snooker balls consists of 15 red balls and one each of yellow, green, brown, blue, pink, black and white.

One ball is chosen at random. Find the probability of these outcomes.

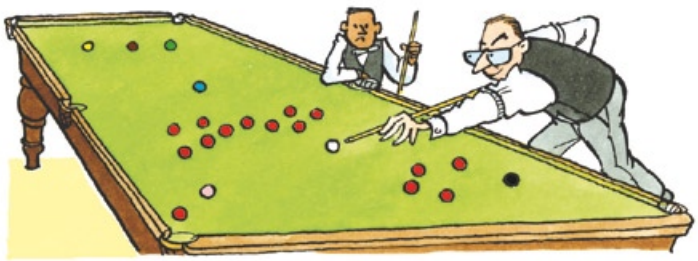
a red

b not red

c green

d not green

e either blue or pink



7 Work out the probability that this spinner will land on these colours.

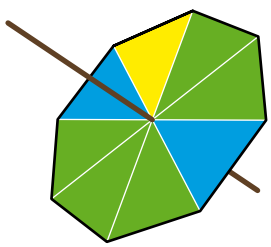
a yellow

b blue

c green

d either blue or green

e not blue



8 There are 45 cars in the school car park. 15 are silver, 9 are red, 6 are blue, 5 are white and the rest are black. Calculate the probability that the first car to leave will be this colour.

a silver

b white

c neither silver nor white

d black or blue

9 You have a pack of 52 playing cards and deal one card from the pack.

Work out the probability of dealing these cards.

a a red card

b a heart

c not a heart

d either a spade or a diamond

e not a queen

f not a picture card

There are four suits in a pack of cards: hearts and diamonds which are red; clubs and spades which are black.

Each suit contains an Ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, jack, queen and king.

The picture cards are jack, queen and king.

10 Mike travels to school by bus. The probability that the bus is on time is 0.82.

a What is the probability that the bus is not on time?

b Will the probability that the bus is late be the same as your answer to part **a**? Explain.

11 The probability that Lucy hands her homework in on time is 0.75. The probability that she hands it in early is 0.1. What is the probability that she hands her homework in late?

12 A letter is chosen at random from the word MATHEMATICS.

a How many possible outcomes are there?

b What is the probability that the letter is M?

c What is the probability that the letter is either A, E or I?

d What is the probability that the letter is not T?

explanation 3 online

13 Draw a table to show all the possible outcomes when two coins are spun. Use your table to find the probabilities of these events.

a Two tails are thrown.

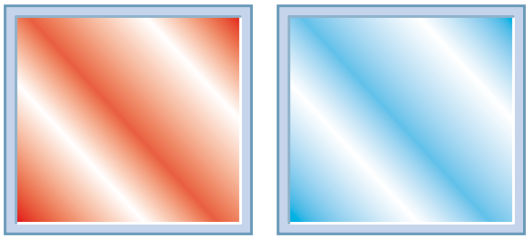
b Both coins land the same way up.

14 On Monday the canteen offered pasta bake, chicken korma or veggie burgers. For pudding the choice was fruit salad or sponge pudding. Ian has one main course and one pudding. Draw a table to show all the possible meals he could choose.

Main course	Pudding

15 A cooked breakfast is available each morning. Pupils can choose any two of these items: sausage, bacon, scrambled eggs and beans. Write all the different breakfasts you could choose.

16 A glazier can put red, green or blue glass in each of two windows. List all the possible ways he can glaze the two windows.



17 Amy spins a coin and rolls a dice. Some of the possible outcomes are shown on this sample space diagram.

		Dice					
		1	2	3	4	5	6
Coin	H	H, 1	H, 2				
	T				T, 4		T, 6

a Copy and complete the diagram.

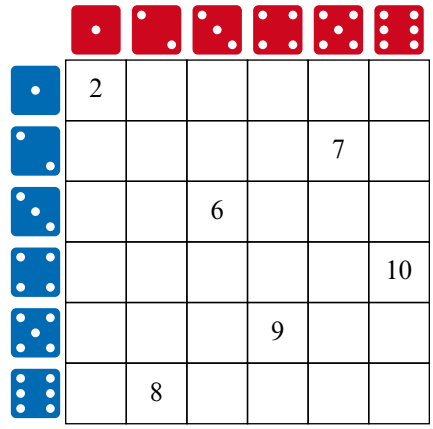
b What is the total number of outcomes?

c What is the probability of getting a head and a 5?

d What is the probability of getting a tail and a number less than 4?

e What is the probability of getting a 2?

18 A red and a blue dice, each numbered from 1 to 6, are rolled and the scores are added together.



a Copy and complete the sample space diagram to show all the possible outcomes.

b Which outcome is most likely?

c Use the diagram to find the probability of these events.

i The same number on both dice.

ii The sum of the numbers is less than 10.

iii The score on the red dice is exactly double the score on the blue dice.

19 Neera has a 2p coin, a 10p coin and a 20p coin. She spins each of them and records whether they land head up or tail up.

a List all the possible outcomes.

b Use your list to find the probability of these events.

i All three coins land head up.

ii No coins land head up.

iii At least one coin lands head up.

20 Two four-sided dice, each numbered 1, 2, 3 and 4, are rolled, and the numbers scored are multiplied together.

a Draw a sample space diagram to show all the possible outcomes.

b Use your diagram to find the probability of these events.

i an even number

ii an odd number

iii a multiple of 3

iv a factor of 24