Probability

- Deciding whether outcomes are mutually exclusive
- Using relative frequency to work out probability

Keywords

You should know

explanation 1a explanation 1b

1 This fair six-sided spinner is spun once.
What is the probability that the spinner will land on these colours?

a yellow

b blue

c purple

2 Jon rolls a fair dice. What is the probability of these events?

a rolling a number less than 3

b rolling a multiple of 3

c rolling an even number

d rolling a number greater than 6

3 Amy has 4 red, 3 yellow and 5 blue pencils. She takes a pencil at random.
What is the probability that she takes these colours?

a a yellow pencil

b a blue pencil

c a yellow or a red pencil

d a green pencil

4 A letter is chosen at random from the word EXPERIMENT.

a What is the probability that the letter is X?

b What is the probability that the letter is E?

c What is the probability that the letter is X or E?

5 The two-way table shows some information about the pupils in a class.

	Girls	Boys	Total
Wears glasses	4	7	11
Does not wear glasses	20	15	35
Total	24	22	46

One of these pupils is chosen at random.
What is the probability that these pupils are chosen?

a a girl

b a boy who wear glasses

c a girl who does not wear glasses

6 The two-way table shows which type of pizza some adults said was their favourite.

	Margarita	Salami	Ham	Total
Male	14	27	15	56
Female	11	10	23	44
Total	25	37	38	100

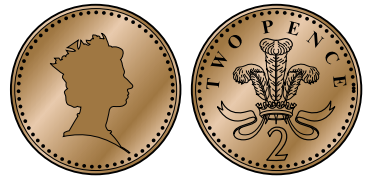
One of these adults is chosen at random.
Give, as a decimal, the probability of these choices.

a an adult who said a margarita pizza was their favourite

b a female whose favourite pizza was ham

c a male

7 Brendan spins a fair coin twice.



a Write down all the possible outcomes.

b What is the probability of obtaining two heads?

8 Frank has a fair three-sided spinner marked 1, 2 and 3. He spins it twice.

a Write all the possible outcomes.

b What is the probability that he gets two numbers the same?

c What is the probability that he gets a total of 4?

d What is the probability that he gets a total greater than 2?

explanation 2a | explanation 2b | online

9 Serena is going to the cinema with a friend. The probability that her friend will be late is 0.34. What is the probability that her friend will not be late?

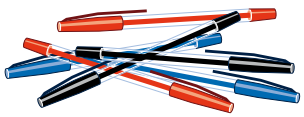
10 The probability that a football team will win a match is 0.54.
The probability that the team will draw is 0.2.
What is the probability that the team will lose the match?

11 The probability that it will rain one day is $\frac{2}{3}$.
What is the probability that it will not rain that day?

12 Cassie cycles to school. The probability that she will arrive on time is $\frac{1}{4}$.
The probability that she will arrive late is $\frac{2}{3}$.
What is the probability that she will arrive early?

13 Jake has some pens in his pencil case. The pens are all red or black or blue. He takes a pen at random from his pencil case. The table gives the probability that the pen will be red or black. What is the probability that the pen is blue?

Pen colour	Red	Black	Blue
Probability	0.25	0.6	



14 A bag contains only red, yellow, green and blue counters. A counter is taken at random from the bag. The table gives the probability that the counter will be red or yellow or green. Work out the probability that the counter will be blue.

Pen colour	Red	Yellow	Green	Blue
Probability	0.1	0.3	0.2	

15 Jalinda has a box of chocolates. The chocolates are all milk or plain or white. She takes a chocolate at random from the box.
The table gives the probability that the chocolate will be either milk or white.
Work out the probability that the chocolate will be plain.

Chocolate	Milk	Plain	White
Probability	0.15		0.3

explanation 3 online

16 Tim has a biased four-sided spinner numbered 1, 2, 3 and 4.
He spins it 200 times. The table shows his results.

Number	1	2	3	4
Frequency	20	50	30	100

a Work out the relative frequency of the spinner landing on a 4.

b Work out the relative frequency of the spinner landing on a 3.

c Tim spins the spinner again. What are the probabilities of these outcomes?

i The spinner lands on a 4. **ii** The spinner lands on a 3.

d Work out the probabilities of these outcomes.

i The spinner lands on a 1. **ii** The spinner lands on a 2.

17 Paula throws a biased coin 300 times. It lands head up 50 times.

a Work out the relative frequency that the coin lands head up.

b The coin is thrown again.
Estimate the probability that the coin will land *tail* up.

18 Jerry stood outside his school. He recorded the colours of all cars that passed by. The table shows the results of his survey.

Colour	Red	Silver	White	Black	Blue	Other
Frequency	38	20	23	17	54	48

a How many cars did Jerry record the colour of?

b Estimate the probability that the next car that goes past will be these colours.

i silver **ii** blue **iii** not blue

19 A bag contains red and blue counters. Michael takes a counter at random from the bag. He records its colour and then puts the counter back in the bag. He carries out this experiment 80 times. The table shows his results.
Work out the probability that the next counter he takes will be these colours.

Colour	Red	Blue
Frequency	64	16

a red **b** blue