



- 1 Kwame tosses a fair coin 200 times.
How many heads would you expect?

(2 marks)

$$P(\text{head}) = \frac{1}{2}$$

$$\frac{1}{2} \times 200 = 100$$

100 heads

- 2 Priya throws a fair six-sided dice 300 times.
How many times would you expect to get:

- a. a six,
b. a number greater than 4?

(2 marks)

a)

$$\frac{1}{6} \times 300 = 50$$

b)

$$5 \text{ or } 6: P = \frac{2}{6} = \frac{1}{3}$$

$$\frac{1}{3} \times 300 = 100$$

a) 50 b) 100

- 3 The probability that a bus is late is 0.12.
Tamsin catches the bus on 250 days. Work out how many days you would expect the bus to be late.

(2 marks)

$$0.12 \times 250$$

$$= 30$$

30 days

- 4 A biased spinner has four colours. The table shows the probability of each colour.

Colour	red	blue	green	yellow
Probability	0.4	0.25	0.2	0.15

The spinner is spun 80 times. Work out the number of times you expect it to land on:

- a. blue,
b. green or yellow.

(3 marks)

a)

$$0.25 \times 80 = 20$$

b)

$$0.2 + 0.15 = 0.35$$

$$0.35 \times 80 = 28$$

a) 20 b) 28

- 5 Jin spins a four-sided spinner 120 times. The table shows his results.

Number	1	2	3	4
Frequency	28	35	32	25

- a. Write down the relative frequency of the spinner landing on 2.
b. Use the results to estimate how many times the spinner will land on 3 in 600 spins.

(3 marks)

a)

$$\frac{35}{120} = \frac{7}{24}$$

b)

$$P(3) = \frac{32}{120} = \frac{4}{15}$$

$$\frac{4}{15} \times 600 = 160$$

a) $\frac{7}{24}$ b) 160

- 6 The probability that a bus is late on any day is 0.15.

Nadia catches this bus on 40 days.

Work out an estimate for the number of days the bus is late.

(2 marks)

Expected number of late days = probability $\times$ number of days

$$0.15 \times 40 = 6$$

6

7

Zoe and Tom each drop the same drawing pin and record how often it lands point up.

	Number of drops	Point up
Zoe	50	18
Tom	150	57

a. Using all the results, work out the best estimate of the probability that the pin lands point up.

b. The pin is dropped 800 times. Estimate how many times it lands point up.

(3 marks)

a.)

$$18 + 57 = 75$$

$$50 + 150 = 200$$

$$\frac{75}{200} = \frac{3}{8}$$

b.)

$$\frac{3}{8} \times 800 = 300$$

$$\boxed{a) \frac{3}{8} \quad b) 300}$$

8

Ibrahim rolls a biased dice 200 times. It lands on a six 44 times and on a five 36 times.

a. Estimate the probability that the dice lands on a five or a six.

b. Estimate how many times it lands on a five or a six in 1500 rolls.

(3 marks)

a.)

$$44 + 36 = 80$$

$$\frac{80}{200} = \frac{2}{5}$$

b.)

$$\frac{2}{5} \times 1500 = 600$$

$$\boxed{a) \frac{2}{5} \quad b) 600}$$

- 9 Tyrone spins a coin 10 times and gets 7 heads. Fiona spins the same coin 500 times and gets 262 heads.

- a. Whose results give the better estimate of the probability of heads? Give a reason.
b. Use the better estimate to work out how many heads to expect in 1000 spins.

(3 marks)

a)

Fiona - 500 spins is far more than 10

More trials = more reliable

b)

$$\frac{262}{500} \times 1000 = 524$$

a) Fiona b) 524

- 10 A bag contains only red counters and blue counters in the ratio 3 : 5.

Hana takes a counter at random, notes its colour and puts it back. She does this 160 times.

How many times would you expect her to take a red counter?

(3 marks)

$$3 + 5 = 8$$

$$P(\text{red}) = \frac{3}{8}$$

$$\frac{3}{8} \times 160 = 60$$

60 times

- 11 Three friends each play a game with their own spinner. The probability of winning is shown for each spinner.

Chen	Ayla	Mo
0.3	$\frac{2}{5}$	35%

Each person plays 200 times.

- a. Who is expected to win the most games?
b. How many games is this person expected to win?

(4 marks)

Chen 0.3

$$\text{Ayla } \frac{2}{5} = 0.4$$

$$\text{Mo } 35\% = 0.35$$

Ayla is highest

$$0.4 \times 200 = 80$$

a) Ayla b) 80

- 12 A five-sided spinner can land on 1, 2, 3, 4 or 5.

The table shows some of the probabilities.

Number	1	2	3	4	5
Probability	0.1	0.2	0.25	0.15	

- a. Work out the probability that the spinner lands on 5.
b. The spinner is spun 300 times. Work out an estimate for the number of times it lands on 5. (4 marks)

$0.1 + 0.2 + 0.25 + 0.15 = 0.7$, and the probabilities must sum to 1

$$P(5) = 1 - 0.7 = 0.3$$

Estimate for the number of 5s = $0.3 \times 300 = 90$

- 13 A box contains white, black, silver and gold beads.

The probability of picking each colour at random is shown in the table.

Colour	white	black	silver	gold
Probability	0.16	0.24	0.4	0.2

There are 12 white beads in the box.

- a. Work out the total number of beads in the box.
b. Work out the number of black beads in the box. (4 marks)

$P(\text{white}) = 0.16$ and there are 12 white beads, so the total = $12 \div 0.16 = 75$

Number of black beads = $0.24 \times 75 = 18$

Check

the probabilities $0.16 + 0.24 + 0.4 + 0.2 = 1$

- 14 A four-sided spinner can land on 1, 2, 3 or 4.

The table shows some of the probabilities.

Number	1	2	3	4
Probability	0.2	0.35	0.15	

- a. Work out the probability that the spinner lands on 4.
b. The spinner is spun 200 times. Work out an estimate for the number of times it lands on 4. (4 marks)

The probabilities must add up to 1, and $0.2 + 0.35 + 0.15 = 0.7$

$$P(4) = 1 - 0.7 = 0.3$$

Estimated number of 4s in 200 spins = $0.3 \times 200 = 60$

15

A bag contains only red, green and yellow counters.

The number of green counters is 4 times the number of red counters.

The number of yellow counters is 6 more than the number of red counters.

A counter is taken from the bag at random.

The probability that it is red is $\frac{1}{8}$.

Work out the number of yellow counters in the bag.

(5 marks)

Let the number of red counters be x . Then green = $4x$ and
yellow = $x + 6$

$$\text{Total} = x + 4x + x + 6 = 6x + 6$$

$$P(\text{red}) = \frac{x}{6x + 6} = \frac{1}{8}, \text{ so } 8x = 6x + 6$$

$$2x = 6, \text{ so } x = 3$$

$$\text{Yellow counters} = 3 + 6 = 9$$

Check

$$\text{red } 3, \text{ green } 12, \text{ yellow } 9, \text{ total } 24, \text{ and } P(\text{red}) = \frac{3}{24} = \frac{1}{8}$$

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