

Name: _____

GCSE (1 – 9)

Probability and Relative Frequency

Instructions

- Use **black** ink or ball-point pen.
- Answer all questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information

- The marks for each question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

1 The probability that a biased dice will land on a 6 is 0.3

The dice is going to be rolled 200 times.

Work out an estimate for the number of times the dice will land on 6.

$$0.3 \times 200$$

60

(Total for question 1 is 2 marks)

2 The probability that a sunflower seed will germinate is 0.9

Alan is going to plant 50 sunflower seeds.

Work out an estimate for the number of seeds that will germinate.

$$0.9 \times 50$$

45

(Total for question 2 is 2 marks)

3 The probability that Frank scores a penalty is 0.86

Frank is going to take 50 penalties

Work out an estimate for the number of times Frank will score.

$$0.86 \times 50$$

43

(Total for question 3 is 2 marks)

4 The probability that Matt scores a penalty is 0.96

Matt is going to take 25 penalties.

Work out an estimate for the number of times Matt will score.

$$0.96 \times 25$$

24

(Total for question 4 is 2 marks)

5 In a bag there are only red counters, blue counters and white counters

A counter is taken at random from the bag.

The table shows the probability of the counter being red and blue.

Colour	Red	Blue	White
Probability	0.5	0.3	0.2

Complete the table to show the probability that counter will be white.

$$0.5 + 0.3 = 0.8$$

$$1 - 0.8 = 0.2$$

(Total for question 5 is 2 marks)

6 In a box there are only black pens, blue pens and green pens

A pen is taken at random from the box.

The table shows the probability of the pen being black and blue.

Colour	Black	Blue	Green
Probability	0.64	0.24	0.12

Complete the table to show the probability that pen will be green.

$$0.64 + 0.24 = 0.88$$

$$1 - 0.88 = 0.12$$

(Total for question 6 is 2 marks)

7 A biased spinner can land on red, blue, yellow and green.

The table shows the probabilities that the spinner will land on red, blue and yellow.

Colour	Red	Blue	Yellow	Green
Probability	0.25	0.34	0.22	0.19

Complete the table to show the probability that spinner will land on green.

$$0.25 + 0.34 + 0.22 = 0.81$$

$$1 - 0.81 = 0.19$$

(Total for question 7 is 2 marks)

8 In a bag there are only red counters, blue counters and white counters

number of red counters : number of blue counters : number of white counters = 5 : 4 : 3

A counter is taken at random from the bag.

Colour	Red	Blue	White
Probability	$\frac{5}{12}$	$\frac{4}{12}$	$\frac{3}{12}$

Complete the table to show the probabilities of the counter being red, blue or white.

(Total for question 8 is 2 marks)

9 In a bag there are only black counters, white counters and red counters.

A counter is taken at random from the bag.

The table shows the probability of taking a black counter and a white counter.

Colour	Black	White	Red
Probability	$\frac{3}{10}$	$\frac{3}{5}$	$\frac{1}{10}$

Complete the table to show the probabilities of the counter being red.

$$\frac{3}{10} + \frac{3}{5}$$

$$\frac{3}{10} + \frac{6}{10} = \frac{9}{10}$$

$$1 - \frac{9}{10} = \frac{1}{10}$$

(Total for question 9 is 2 marks)

10 A biased spinner can land on red, blue, yellow and green.

The table shows the probabilities that the spinner will land on red and yellow.

Colour	Red	Blue	Yellow	Green
Probability	0.18	0.28	0.26	0.28

The probability of landing on blue is the same as the probability of landing on green.

Complete the table to show the probabilities of spinner landing on blue and green.

$$0.18 + 0.26 = 0.44$$

$$1 - 0.44 = 0.56$$

$$\frac{0.56}{2} = 0.28$$

(Total for question 10 is 2 marks)

- 11 A biased spinner can land on red, blue, yellow and green.

The table shows the probabilities that the spinner will land on red, blue and yellow.

Colour	Red	Blue	Yellow	Green
Probability	0.3	0.25	0.15	

- (a) Complete the table.

$$0.3 + 0.25 + 0.15 = 0.7$$

$$1 - 0.7 = 0.3$$

(2)

Kelly is going to spin the spinner 60 times.

- (b) Work out an estimate for the number of times the spinner will land on red.

$$60 \times 0.3 = 18$$

18

(2)

(Total for question 11 is 4 marks)

- 12 In a bag there are only red counters, blue counters and white counters.

A counter is taken at random from the bag.

The table shows the probability of getting a red counter.

Colour	Red	Blue	White
Probability	0.2	0.4	0.4

The probability of getting a blue counter is the same as the probability of getting a white counter.

- (a) Complete the table.

$$1 - 0.2 = 0.8$$

$$\frac{0.8}{2} = 0.4$$

(2)

There are 18 red counters in the bag.

- (b) Work out the total number of counters in the bag.

$$\begin{array}{r} 0.2x = 18 \\ \times 5 \qquad \times 5 \end{array}$$

$$x = 90$$

90

(2)

(Total for question 13 is 4 marks)

- 13 A biased spinner can land on 1, 2, 3 or 4.
The table shows the probabilities that the spinner will land on 2 and 4.

Number	1	2	3	4
Probability	0.34	0.32	0.17	0.17

$$2x$$

$$x$$

The probability that the spinner will land on 1 is **twice** the probability that the spinner will land on 3.

- (a) Complete the table.

$$0.32 + 0.17 = 0.49$$

$$1 - 0.49 = 0.51$$

$$3x = 0.51$$

(2)

$$x = 0.17$$

$$2x = 0.34$$

Johnny is going to spin the spinner 200 times.

- (b) Work out an estimate for the number of times the spinner will land on 2.

$$200 \times 0.32 = 64$$

64

(2)

(Total for question 13 is 4 marks)

- 14 The table shows the probabilities that a biased dice will land on 1, on 2, on 3, on 5 and on 6.

Number	1	2	3	4	5	6
Probability	0.14	0.2	0.08	0.24	0.13	0.21

The dice is rolled 200 times.

Work out an estimate for the number of times the dice will land on 2 or on 4.

$$0.14 + 0.2 + 0.08 + 0.13 + 0.21 = 0.76$$

$$1 - 0.76 = 0.24$$

$$2 \text{ or } 4 : 0.2 + 0.24 = 0.44$$

$$200 \times 0.44 = 88$$

88

(Total for question 14 is 3 marks)

15 In a box there are only red pens, blue pens, black pens and green pens.

A pen is taken at random from the box.

The table shows the probabilities that the pen will be red or will be green.

Colour	Red	Blue	Black	Green
Probability	0.42	x	$3x$	0.14

The probability that the pen will be black is three times the probability that the pen will be blue.

There are 28 green pens in the box.

Work out the number of black pens in the box.

$$0.42 + 0.14 = 0.56$$

$$1 - 0.56 = 0.44$$

$$4x = 0.44$$

$$x = 0.11$$

$$3x = 0.33$$

$$0.14 \times y = 28$$

$$y = 200$$

$$0.33 \times 200 = \underline{66}$$

66

(Total for question 15 is 4 marks)

16 In a bag there are only red counters, blue counters, green counters and yellow counters.

A counter is taken at random from the bag.

The table shows the probabilities that the counter will be green or will be yellow.

Colour	Red	Blue	Green	Yellow
Probability			0.35	0.20

The probability that the counter will be red is twice the probability that the counter will be blue.

There are 21 green counters in the bag.

Work out the number of red counters in the bag.

$$0.35 + 0.2 = 0.55$$

$$1 - 0.55 = 0.45$$

$$3x = 0.45$$

$$x = 0.15$$

$$2x = 0.3$$

$$0.35y = 21$$

$$y = 60$$

$$0.3 \times 60 = 18$$

18

(Total for question 16 is 4 marks)