

Relative Frequency and Expected Outcomes

For AQA GCSE Mathematics (8300) • Foundation tier

Name _____

Total marks: **27**

Answer **all** questions in the spaces provided. Show your working: marks are given for correct method.

- 1** Imogen flips a plastic bottle 60 times.
It lands upright 9 times.

(a) Write down the relative frequency of the bottle landing upright.

[1 mark]

Answer _____

(b) Imogen says,

“The probability that the bottle lands upright is exactly 0.15”

Give a reason why she might be wrong.

[1 mark]

- 2** The probability that a spinner lands on red is 0.3
The spinner is spun 150 times.
Work out the expected number of times it lands on red.

[2 marks]

Answer _____

- 3** The probability that a biased coin lands on heads is 0.65
The coin is thrown 300 times.
Work out an estimate for the number of times the coin lands on tails.

[2 marks]

Answer _____

- 4** Jo rolls a dice 50 times.
Here are her results.

Score	1	2	3	4	5	6
Frequency	6	9	8	7	10	10

- (a) Work out the relative frequency of rolling a 5

[1 mark]

Answer _____

- (b) Jo says the dice is biased because she rolled more 5s and 6s than 1s.
Is she correct? Tick a box.
Give a reason for your answer.

[1 mark]

☐ Yes

☐ No

- 5** A garden centre sowed 200 tomato seeds.
The table shows what happened.

Result	Frequency
Did not grow	30
Grew, but the plant died	20
Grew into a healthy plant	150

- (a) Write down the relative frequency that a seed grew into a healthy plant.

[1 mark]

Answer _____

- (b) Next year the garden centre wants 600 healthy plants.
Using the results in the table, work out how many seeds it should sow.

[2 marks]

Answer _____

- 6** There are 50 counters in a bag.
Harry takes a counter at random, records its colour and puts it back.
He does this 40 times.
He gets a red counter 12 times.
Work out an estimate of the number of red counters in the bag.

[2 marks]

Answer _____

- 7** Four groups each spin the same spinner.
The table shows how many times it lands on blue.

Group	Number of spins	Number of blues
1	30	11
2	30	8
3	60	19
4	80	22

- (a) Use all of the results to work out an estimate of the probability that the spinner lands on blue.

[2 marks]

Answer _____

- (b) The spinner will be spun another 500 times.
Use your answer to part (a) to work out an estimate for the number of times it lands on blue.

[1 mark]

Answer _____

- 8** A bus company records whether its buses arrive early, on time or late.
Out of 160 buses, 24 arrived early.
The relative frequency of a bus arriving late is 0.35
Work out the relative frequency of a bus arriving on time.

[3 marks]

Answer _____

- 9 Mia rolls a dice 100 times, in five sets of 20 rolls.
The table shows the number of sixes in each set.

Set	1st	2nd	3rd	4th	5th
Number of sixes	4	2	5	3	6

Work out the best estimate for the probability of rolling a six.
Give a reason for your answer.

[2 marks]

Answer _____

- 10** Emma and Tom each test some bulbs from the same factory to see if they are faulty. The table shows their results.

	Emma	Tom
Number of bulbs tested	40	250
Number of faulty bulbs	4	20

- (a) Tom says,

“My results show a smaller proportion of faulty bulbs than Emma’s results.”

Is Tom correct? Tick a box.

You must show your working.

[2 marks]

☐

Yes

☐

No

- (b) The factory makes 5000 bulbs each day.

Emma says,

“Using my results, about 500 bulbs each day will be faulty.”

Tom says,

“Using my results, about 400 bulbs each day will be faulty.”

Whose estimate is more reliable?

Give a reason for your answer.

[1 mark]

- 11** Nina rolls a dice 120 times.
The relative frequency of rolling a six is 0.15
She then rolls the dice 80 more times.
After all 200 rolls, the relative frequency of rolling a six is 0.19
How many sixes did Nina roll in the last 80 rolls?

[3 marks]

Answer _____