Name:

Exam Style Questions

Relative Frequency

Corbettmaths

Equipment needed: Ruler, Pencil, Calculator, Pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

www.corbettmaths.com/contents

Video 248

Answers and Video Solutions

1. Jordan throws a ball at a target 10 times.

   He records his results as H (hit) or M (miss).

   H M M M M H M . H M M
   ₁   ₂   ₃

   Write down the relative frequency of Jordan hitting the target.

   $\frac{3}{10}$

   ....

   (1)

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2. A spinner is spun 100 times.
   It lands on blue 19 times.

   Write down the relative frequency it lands on blue.

   $\frac{19}{100}$

   ....

   (1)

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3. Matilda rolls a dice 60 times.

   The table shows the results.

Number on Dice	1	2	3	4	5	6
Frequency	15	9	8	10	13	5

   What is the relative frequency of a 2?

   $\frac{9}{60} = \frac{3}{20}$

   $\frac{3}{20}$

   ....

   (1)

4. Josie wants to test if a coin is biased.
She flips the coin 30 times.
Here are here results.

H T H T H H H T H H
H T H H H T H H H T
H H H H T H H H T H

(a) Complete the relative frequency table.

	22	8
	Heads	**Tails**
Relative frequency	$\frac{22}{30}$ or $\frac{11}{15}$	$\frac{8}{30}$ or $\frac{4}{15}$

(2)

(b) Do you think the coin is biased?
Explain your answer.

Yes, as the coin is flipped 30 times, you would expect 15 heads and 15 tails.
22 heads is a lot higher than 15.

(1)

(alternatively – No, as coin is only flipped 30 times)

(c) Josie decides to flip the coin 150 times.
Calculate an estimate of the number of times that the coin will land on tails.

8 tails from 30 flips

×5 ↓   ↓ ×5

40 tails from 150 flips

40

(2)

5. Kevin rolls a dice 30 times.

$$3\ 4\ 4\ 4\ 6\ 5\ 4\ 5\ 6\ 4$$
$$1\ 3\ 2\ 4\ 4\ 5\ 6\ 4\ 4\ 2$$
$$4\ 5\ 6\ 3\ 2\ 3\ 5\ 6\ 2\ 3$$

(a) Complete the relative frequency table.

Number on dice	1	2	3	4	5	6
Relative frequency	$\frac{1}{30}$	$\frac{2}{15}$	$\frac{1}{6}$	$\frac{1}{3}$	$\frac{1}{6}$	$\frac{1}{6}$

or $\frac{1}{30}$ $\frac{4}{30}$ $\frac{5}{30}$ $\frac{10}{30}$ $\frac{5}{30}$ $\frac{5}{30}$

(2)

(b) Do you think the dice is biased?
Explain your answer.

Yes - when rolling 30 times, you would expect 5 of each number. Only 1 one and ten 4s suggests the dice could be biased.

(1)

(c) Kevin decides to roll the dice 600 times.
Calculate an estimate of the number of times that the dice will land on 4.

10 fours from 30 rolls

↓ ×20   ↓ × 20

200 fours   600 rolls

200

(2)

6. A biased coin is flipped 20 times.
   It lands on tails 5 times.

   Write down the relative frequency of the coin landing on heads.

   $20 - 5 = 15$ heads

   $\frac{15}{20}$

   $\frac{3}{4}$

   ....

   (1)

7. Omar and Kate want to work out the probability that a biased coin will land on heads.

   Omar flips the coins 20 times.
   It lands on heads 17 times.

   Kate flips the coin 60 times.
   It lands on heads 50 times.

   Write down the relative frequency of the coin landing on heads based on

   (a) Omar's results

   $\frac{17}{20}$

   ....

   (1)

   (b) Kate's results

   $\frac{50}{60} = \frac{5}{6}$

   $\frac{5}{6}$

   ....

   (1)

   (c) Whose results will give a better estimate for the probability of the coin landing on heads?
   Explain your answer.

   Kate's results - as she has completed more trials (flips).

   (2)

8. David and Becky want to estimate how many yellow jelly beans are in a tub of 500 jelly beans.
A trial consists of taking a jelly bean at random, noting the colour and replacing the jelly bean in the tub.

	Number of trials	Number of yellow jelly beans chosen
David	20	3
Becky	100	11

(a) Write down the relative frequency of David taking a yellow jelly bean.

$\frac{3}{20}$

(1)

(b) Write down the relative frequency of Becky taking a yellow jelly bean.

$\frac{11}{100}$

(1)

(c) Whose experiment will give the more reliable estimate of the number of yellow jelly beans in the tub?
Give a reason for your answer.

Becky's experiment as she has completed more trials.

(1)

9. A spinner is spun 200 times.
The relative frequency of orange is 0.3

Work out how many times the spinner landed on orange.

$$200 \times 0.3 = 60$$

60

(1)

10. A coin is flipped 50 times.

Molly records the results and says the relative frequency of tails is 0.85

Explain why Molly is incorrect.

$$50 \times 0.85 = 42.5$$

42.5 tails is not possible, so the relative frequency of 0.85 is not possible.

(2)

11. A spinner lands on white, black, red or orange.
The relative frequencies after 120 spins are shown in the table.

Colour	White	Black	Red	Orange
Relative Frequency	0.25	0.4	0.2	0.15

How many more times did the spinner land on white than orange?
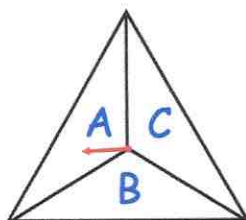
$$120 \times 0.25 = 30$$
$$120 \times 0.15 = 18$$

$$30 - 18 = 12$$

12

(3)

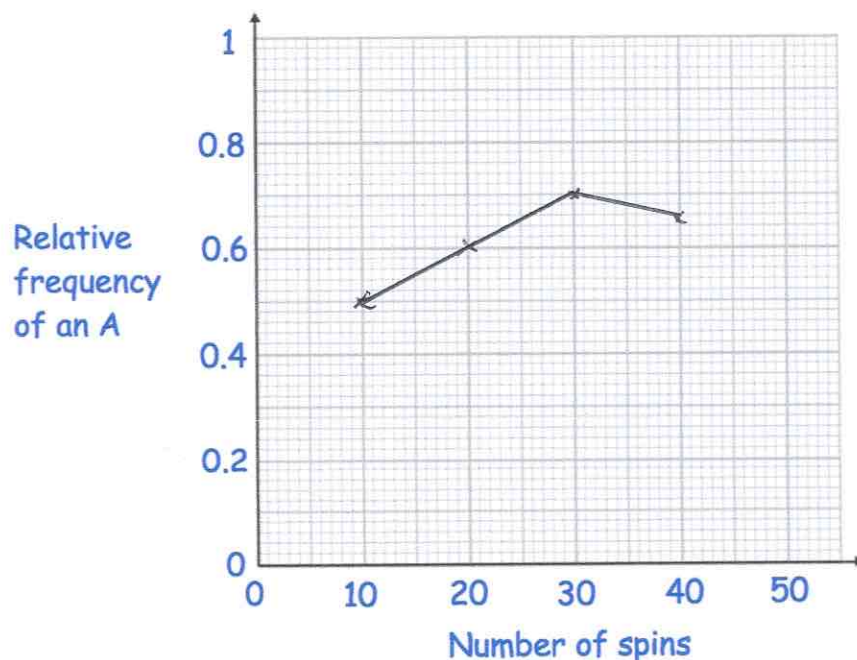12. A three-sided spinner is labelled A, B and C.

The spinner is spun and the frequency the letter A is recorded every 10 spins.
The table below shows this information.

Spins	10	20	30	40
Frequency of an A	5	12	21	26

$\frac{5}{10} = 0.5$ $\frac{12}{20} = 0.6$ $\frac{21}{30} = 0.7$ $\frac{26}{40} = 0.65$

(a) Complete plot the relative frequencies on the graph below.
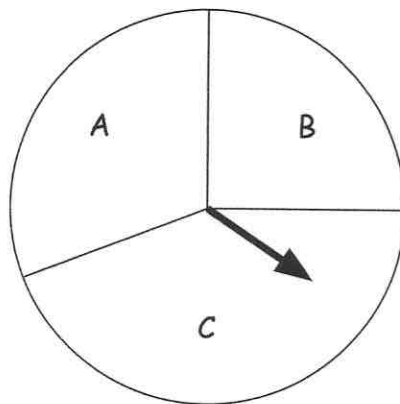

Relative frequency of an A

Number of spins

(3)

(b) Neil says the relative frequency after 50 spins is 0.8
    Explain why Neil must be wrong

$0.8 \times 50 = 40$ but the spinner landed on A 26 times after 40 spins. It would not be possible for 14 more A's in 10 spins.

(2)

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13. A spinner can land on A, B or C.

Megan spins the spinner 800 times.

She notices that the relative frequency of a B is 0.25
The relative frequency of a C is 0.41

Work out how many times the spinner landed on A.

$800 \times 0.25 = 200 \ (B)$

$800 \times 0.41 = 328 \ (C)$

$328 + 200 = 528$

$800 - 528 = 272$

272
....
(3)

14. A spinner has four sections, each labelled A, B, C and D.
Susan and Helen spins the spinner a number of times.
The table shows some information.

	Number of spins	Number of B's	Relative frequency of spinning a B
Susan	20	8	$\frac{8}{20} = 0.4$
Helen	120	42	0.35

120×0.35

Complete the table.

(2)

15. A spinner has a green section and a blue sector.
The spinner is spun 500 times.
The table shows the relative frequency of a green after different numbers of spins.

Number of spins	Relative frequency of a green
100	0.12
200	0.17
300	0.21
400	0.23
500	0.22

How many times was a green obtained after 400 spins?

$400 \times 0.23 = 92$

92
....

(2)

16. There are 50 sweets in a jar.
In a trial, a sweet is chosen at random and then it is replaced.
The results are recorded after every 20 trials.
The graph shows the relative frequency of a blue sweet

Relative frequency (y-axis: 0 to 0.5) vs **Number of trials** (x-axis: 0 to 100)
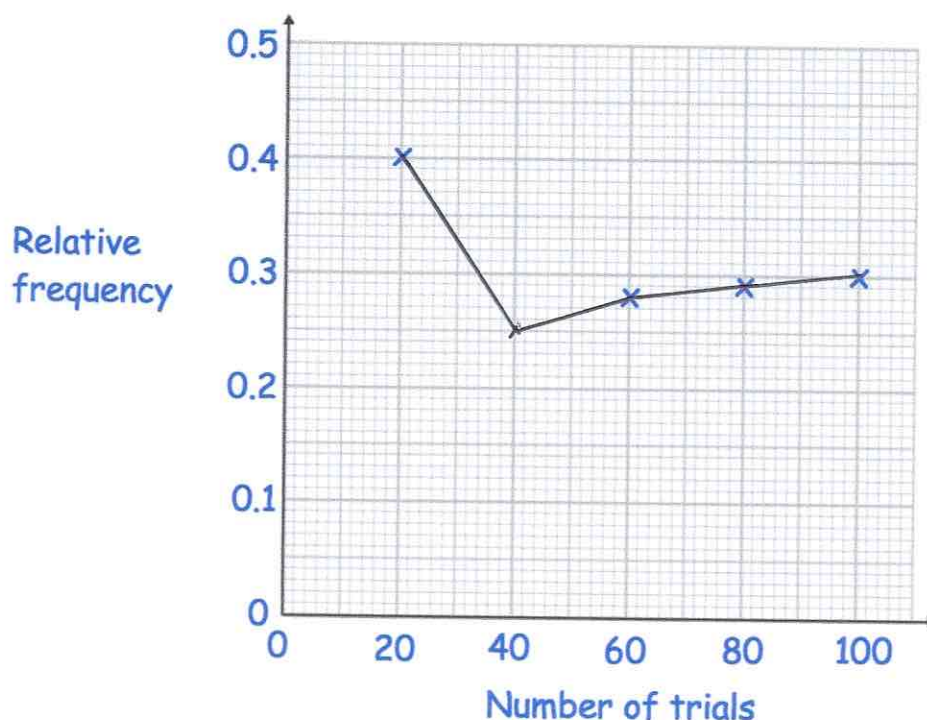
In the first forty trials, ten blue sweets were chosen.

(a) Plot this result on the graph.

$$\frac{10}{40} = \frac{1}{4} = 0.25$$

(1)

(b) What is the best estimate, from the graph, of the probability of choosing a blue sweet?
Explain your answer.

The result of 0.3 when 100 trials were carried out is the best estimate — as this is the result with the most trials.

(2)

(c) Use your answer to estimate the number of blue sweets in the jar.
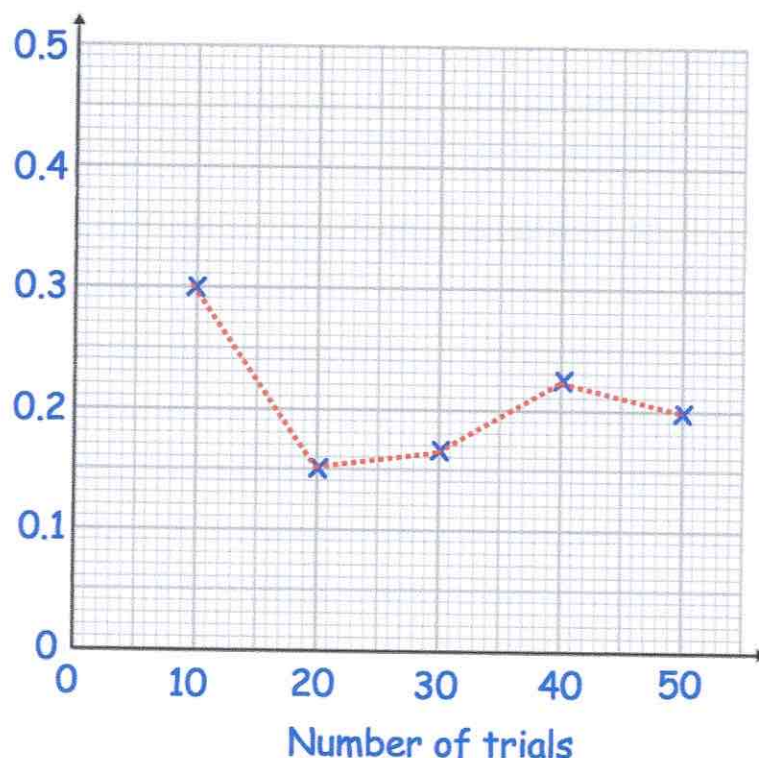
$0.3 \times 50 = 15$

15

(2)

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17. James has a box containing 4000 lego bricks.
He wants to know the probability of picking a white lego brick.
James picks a brick at random and replaces the bricks in the box.
He does this 50 times and calculates the relative frequency of a white after every 10 trials.

(a) Use the graph to calculate the number of times James chose a white brick in the first 10 trials.

$$10 \times 0.3 = 3$$

..........3..........

(2)

(b) What is the best estimate of the probability of choosing a white brick? Explain your answer.

0·2 when 50 trials were carried out, as this is when the most trials were carried out.

(2)

(2)

18. On Saturday, Edward writes the first 400 words of a story.
He spells 392 words correctly and 8 words incorrectly.

On Sunday, Edward writes the remaining 1600 words of the story.
For entire story, the relative frequency of a word spelt incorrectly is 0.013

What percentage of the 1600 words written on Sunday were spelt correctly?

$$2000 \times 0.013 = 26 \text{ words spelt incorrectly}$$

$$26 - 8 = 18 \text{ words spelt incorrectly on Sunday}$$

$$1600 - 18 = 1582 \qquad \frac{1582}{1600} = 0.98875$$

98.875%

....

(3)

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19. A spinner lands on green 700 times.
The relative frequency of green is 0.35

Find the number of times the spinner was spun.

$$0.35 \times \underline{\quad\quad} = 700$$

$$700 \div 0.35 = 2000$$

2000

....

(2)