IGCSE · Cambridge (CIE) · Maths

39 mins 14 questions

Calculator Questions

Basic Probability

Basic Probability / Possibility (Sample Space) Diagrams / Relative & Expected Frequency

Easy (5 questions)	/7
Medium (4 questions)	/11
Hard (5 questions)	/21
Total Marks	**/39**

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Easy Questions

1 The probability that a sweet made in a factory is the wrong shape is 0.0028.
One day, the factory makes 25 000 sweets.

Calculate the number of sweets that are expected to be the wrong shape.

(2 marks)

2 The probability that Kim wins a game is 0.72 .
In one year Kim will play 225 games.

Work out an estimate of the number of games Kim will win.

(2 marks)

3 Sushila, has a bag which contains 10 red balls and 8 blue balls. Sushila takes one ball at random from her bag.

Find the probability that she takes a red ball.

(1 mark)

4 The time taken for each of 120 students to complete a cooking challenge is shown in the table.

Time (t minutes)	$20 < t \leq 25$	$25 < t \leq 30$	$30 < t \leq 35$	$35 < t \leq 40$	$40 < t \leq 45$
Frequency	44	32	28	12	4

A student is chosen at random.

Find the probability that this student takes more than 40 minutes.

(1 mark)

5 The frequency table shows information about the time, m minutes, that each of 160 people spend in a library.

Time (m minutes)	$0 < m \leq 10$	$10 < m \leq 40$	$40 < m \leq 60$	$60 < m \leq 90$	$90 < m \leq 100$	$100 < m \leq 120$
Frequency	3	39	43	55	11	9

Find the probability that one of these people, chosen at random, spends more than 100 minutes in the library.

(1 mark)

Medium Questions

1 Sofia has a bag containing 8 blue beads and 7 red beads only. She takes one bead out of the bag at random and replaces it. She does this 90 times.

Find the number of times she expects to take a red bead.

(2 marks)

2 One of the teachers at a school is chosen at random. The probability that this teacher is female is $\frac{3}{5}$

There are 36 **male** teachers at the school.

Work out the total number of teachers at the school.

(3 marks)

3 Rhiana plays a game.

The probability that she will lose the game is 0.32
The probability that she will draw the game is 0.05

Rhiana is going to play the game 200 times.

Work out an estimate for the number of times Rhiana will win the game.

(3 marks)

4 The table shows the probabilities that a biased dice will land on 2, on 3, on 4, on 5 and on 6

Number on dice	1	2	3	4	5	6
Probability		0.17	0.18	0.09	0.15	0.1

Neymar rolls the biased dice 200 times.

Work out an estimate for the total number of times the dice will land on 1 or on 3.

(3 marks)

Hard Questions

1 (a) A bag contains 7 red discs, 5 green discs and 2 pink discs.

Helen takes one disc at random, records the colour and replaces it in the bag.
She does this 140 times.

Find how many times she expects to take a green disc.

(2 marks)

(b) Helen adds 9 green discs and some pink discs to the discs already in the bag.

The probability of taking a green disc is now $\frac{2}{7}$.

Find the number of pink discs that Helen added to the bag.

(2 marks)

2 There are only blue counters, green counters, red counters and yellow counters in a bag.

Olga is going to take at random a counter from the bag.

The table shows the probability that Olga will take a blue counter and the probability that she will take a yellow counter.

Colour	blue	green	red	yellow
Probability	0.4			0.15

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

Complete the table.

(3 marks)

3 (a) There are some counters in a bag. The counters are red or white or blue or yellow.

Bob is going to take at random a counter from the bag.

The table shows each of the probabilities that the counter will be blue or will be yellow.

Colour	red	white	blue	yellow
Probability			0.45	0.25

There are 18 blue counters in the bag.

The probability that the counter Bob takes will be red is twice the probability that the counter will be white.

Work out the number of red counters in the bag.

(4 marks)

(b) A marble is going to be taken at random from a box of marbles. The probability that the marble will be silver is 0.5

There must be an even number of marbles in the box.

Explain why.

(1 mark)

4 (a) Four friends each throw a biased coin a number of times.
The table shows the number of heads and the number of tails each friend got.

	Ben	**Helen**	**Paul**	**Sharif**
heads	34	66	80	120
tails	8	12	40	40

The coin is to be thrown one more time.

Which of the four friends' results will give the best estimate for the probability that the coin will land heads? Justify your answer.

(1 mark)

(b) Paul says,

"With this coin you are twice as likely to get heads as to get tails."

Is Paul correct?
Justify your answer.

(2 marks)

(c) The coin is to be thrown twice.

Use all the results in the table to work out an estimate for the probability that the coin will land heads both times.

(2 marks)

5 Becky has a biased 6-sided dice.

The table gives information about the probability that, when the dice is thrown, it will land on each number.

Number	1	2	3	4	5	6
Probability	$2x$	0.18	$2x$	$3x$	0.26	x

Becky is going to throw the dice 200 times.

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

(4 marks)