IGCSE · Cambridge (CIE) · Maths

1 hour 24 questions

Non-Calculator Questions

Basic Probability

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

Easy (8 questions)	/13
Medium (8 questions)	/22
Hard (8 questions)	/27
Total Marks	**/62**

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Easy Questions

1 A box contains 3 blue pens, 4 red pens and 8 green pens only. A pen is chosen at random from the box.

Find the probability that this pen is green.

(1 mark)

2 Samira has a bag containing 20 sweets. In the bag, there are 5 red, 6 green and 9 yellow sweets.

Samira chooses one sweet at random from the bag.

Write down the probability that she chooses a yellow sweet.

(1 mark)

3 The probability that a biased dice will land on a five is 0.3

Megan is going to roll the dice 400 times.

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

(2 marks)

4 (a) Jane has a packet of seeds. The probability that a seed will grow is 0.75

What is the probability that a seed will **not** grow?

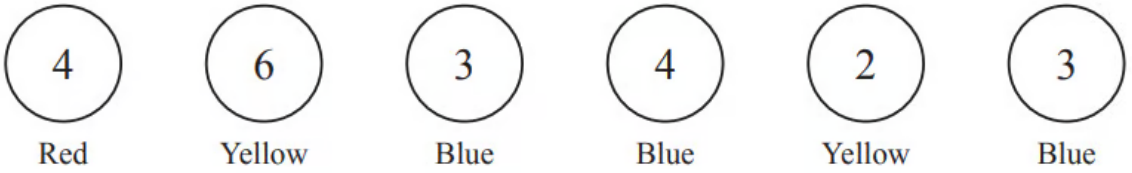
(1 mark)

(b) Jane plants 200 of these seeds.

Estimate the number of the seeds that will grow.

(2 marks)

5



The diagram shows six discs. Each disc has a colour and a number.

One disc is picked at random. Write down the probability that

i) the disc has the number 4,

[1]

ii) the disc is red and has the number 3,

[1]

iii) the disc is blue and has the number 4.

[1]

(3 marks)

6 The heights, metres, of the 120 boys in an athletics club are recorded.
The table shows information about the heights of the boys.

Height (h metres)	$1.3 < h \leq 1.4$	$1.4 < h \leq 1.5$	$1.5 < h \leq 1.6$	$1.6 < h \leq 1.7$	$1.7 < h \leq 1.8$	$1.8 < h \leq 1.9$
Frequency	7	18	30	24	27	14

One boy is chosen at random from the club.

Find the probability that this boy has a height greater than 1.8 m.

(1 mark)

7 The test scores of 14 students are shown below.

21	21	23	26	25	21	22	20	21	23	23	27	24	21

A student is chosen at random.

Find the probability that this student has a test score of more than 24.

(1 mark)

8 20 students each record the mass, p grams, of their pencil case. The table below shows the results.

Mass (p grams)	$0 < p \leq 50$	$50 < p \leq 100$	$100 < p \leq 125$	$125 < p \leq 150$	$150 < p \leq 200$
Frequency	2	5	4	6	3

A student is chosen at random.

Find the probability that this student has a pencil case with a mass greater than 150 g.

(1 mark)

Medium Questions

1 (a) A bag contains blue, red, yellow and green balls only. A ball is taken from the bag at random.
The table shows some information about the probabilities.

Colour	Blue	Red	Yellow	Green
Probability	0.15	0.2		0.43

Complete the table.

(2 marks)

(b) Abdul takes a ball at random and replaces it in the bag. He does this 200 times.

Find how many times he expects to take a red ball.

(1 mark)

2 A group of 200 people were asked which city they would like to visit next. The table shows the results.

City	London	Paris	New York	Tokyo
Number of people	50	48	56	46

A person from the group is chosen at random.

Write down the probability that this person would like to visit either Paris or Tokyo next.

(2 marks)

3 (a) There are only red counters, blue counters, white counters and black counters in a bag.

The table shows the probability that a counter taken at random from the bag will be red or blue.

Colour	red	blue	white	black
Probability	0.2	0.5		

The number of white counters in the bag is the same as the number of black counters in the bag.

Tania takes at random a counter from the bag.

Work out the probability that Tania takes a white counter.

(2 marks)

(b) There are 240 counters in the bag.

Work out the number of red counters in the bag.

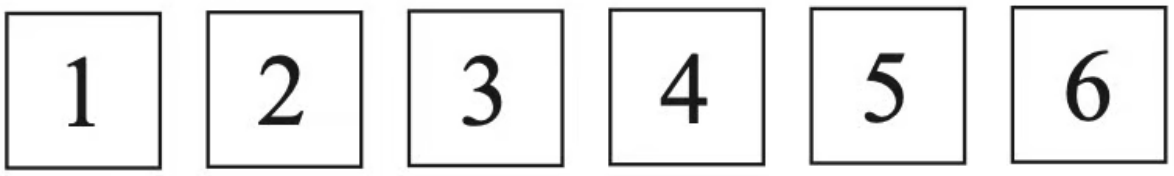
(2 marks)

4 Tanya plants some seeds. When a seed produces flowers, the probability that the flowers are red is 0.6 and the probability that the flowers are yellow is 0.3.

Tanya has a seed that produces flowers.
Find the probability that the flowers are not red and not yellow.

(1 mark)

5 Suleika has six cards numbered 1 to 6.



She takes one card at random, records the number and replaces the card.

i) Write down the probability that the number is 5 or 6.

[1]

ii) Suleika does this 300 times. Find how many times she expects the number 5 or 6.

[1]

(2 marks)

6

The diagram shows 5 cards.

Donald chooses a card at random.

i) Write down the probability that the number of dots on this card is an even number.

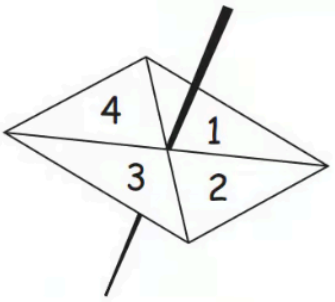
[1]

ii) Write down the probability that the number of dots on this card is a prime number.

[1]

(2 marks)

7 (a) Here is a four sided spinner. The spinner is biased.



The table shows the probabilities that the spinner will land on 1 or on 3

Number	1	2	3	4
Probability	0.2		0.1	

The probability that the spinner will land on 2 is the same as the probability that the spinner will land on 4

Work out the probability that the spinner will land on 4.

(3 marks)

(b) Shunya is going to spin the spinner 200 times.

Work out an estimate for the number of times the spinner will land on 3.

(2 marks)

8 Carol spins a spinner 80 times.

The table shows information about her results.

Outcome	Frequency
J	39
K	25
L	16

Dan spins this spinner 300 times.

Work out an estimate for the number of times that Dan will get an L.

(3 marks)

Hard Questions

1 Bill has some counters in a bag.

3 of the counters are red. 7 of the counters are blue. The rest of the counters are yellow.

Bill takes at random a counter from the bag.

The probability that he takes a yellow counter is $\frac{2}{7}$

How many yellow counters are in the bag before Bill takes a counter?

(2 marks)

2 (a) Karl wants to raise money for charity. He designs a game for people to play.

Karl uses a fair 10-sided dice for the game. The dice is numbered from 1 to 10

Each person will roll the dice once. A person wins the game if the dice lands on a multiple of 4

Ali plays the game once.

Work out the probability that Ali will win the game.

(2 marks)

(b) Each person pays 30p to play the game once. The prize for a win is £1

Karl thinks that the game will be played 100 times.

Work out an estimate for how much money Karl will raise for charity.

(3 marks)

3 There are only blue cubes, yellow cubes and green cubes in a bag.

There are

- twice as many blue cubes as yellow cubes

and

- four times as many green cubes as blue cubes.

Hannah takes at random a cube from the bag.

Work out the probability that Hannah takes a yellow cube.

(3 marks)

4 (a) There are only blue counters, yellow counters, green counters and red counters in a bag.
A counter is taken at random from the bag.

The table shows the probabilities of getting a blue counter or a yellow counter or a green counter.

Colour	blue	yellow	green	red
Probability	0.2	0.35	0.4	

Work out the probability of getting a red counter.

(1 mark)

(b) What is the least possible number of counters in the bag?
You must give a reason for your answer.

(2 marks)

5 There are only red counters, blue counters and purple counters in a bag.
The ratio of the number of red counters to the number of blue counters is 3 : 17

Sam takes at random a counter from the bag.
The probability that the counter is purple is 0.2

Work out the probability that Sam takes a red counter.

(3 marks)

6 There are 5 girls, 6 boys and some adults in a room.
Jenny selects at random one of these people.

The probability that Jenny selects a girl is $\frac{1}{3}$

Work out the probability that Jenny selects an adult.

(3 marks)

7 (a) There are 54 fish in a tank. Some of the fish are white and the rest of the fish are red.

Jeevan takes at random a fish from the tank.

The probability that he takes a white fish is $\frac{4}{9}$

Work out the number of white fish originally in the tank.

(2 marks)

(b) Jeevan puts the fish he took out, back into the tank. He puts some more white fish into the tank. Jeevan takes at random a fish from the tank.

The probability that he takes a white fish is now $\frac{1}{2}$

Work out the number of white fish Jeevan put into the tank.

(2 marks)

8 There are 90 counters in a bag. Each counter in the bag is either red or blue so that

the number of red counters : the number of blue counters = $2 : 13$

Li is going to put some more red counters in the bag so that

the probability of taking at random a red counter from the bag is $\frac{1}{3}$

Work out the number of red counters that Li is going to put in the bag.

(4 marks)