Probability Toolkit

Question Paper

Course	Edexcel IGCSE Maths
Section	6. Statistics & Probability
Topic	Probability Toolkit
Difficulty	Hard

Time allowed: 90

Score: /69

Percentage: /100

Question 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]

Question 2a

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]

Question 2b

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]

Question 3

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]

Question 4

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]

Question 5

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]

Question 6a

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]

Question 6b

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

[2 marks]

Question 7a

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]

Question 7b

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]

Question 8

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]

Question 9a

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]

Question 9b

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]

Question 9c

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]

Question 10a

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]

Question 10b

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]

Question 11

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]

Question 12

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]

Question 13

A bag contains only pink sweets, white sweets, green sweets and red sweets.

The table gives each of the probabilities that, when a sweet is taken at random from the bag, the sweet will be green or the sweet will be red.

Sweet	pink	white	green	red
Probability			0.2	0.35

The ratio

number of pink sweets : number of white sweets = 2 : 1

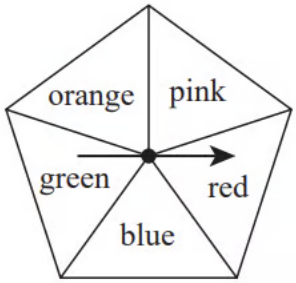
There are 28 red sweets in the bag.

Work out the number of white sweets in the bag.

[5 marks]

Question 14a

Grace has a biased 5–sided spinner.



Grace is going to spin the arrow on the spinner once.

The table below gives the probabilities that the spinner will land on red or on blue or on green.

Colour	Red	Blue	Green	Orange	Pink
Probability	0.20	0.12	0.08		

The probability that the spinner will land on orange is 3 times the probability that the spinner will land on pink.

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

[3 marks]

Question 14b

Grace spins the arrow on the spinner 150 times.

Work out an estimate for the number of times the spinner lands on blue.

[2 marks]

Question 15

A bag contains only red beads, blue beads, green beads and yellow beads.

The table gives the probabilities that, when a bead is taken at random from the bag, the bead will be blue or the bead will be yellow.

Colour	red	blue	green	yellow
Probability		0.24		0.31

The probability that the bead will be green is twice the probability that the bead will be red.

Sofia takes at random a bead from the bag.
She writes down the colour of the bead and puts the bead back into the bag.

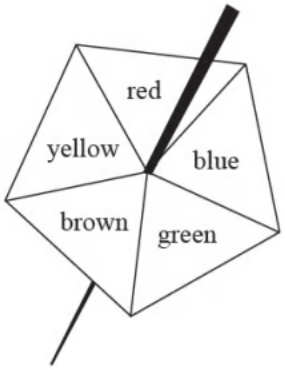
She does this 180 times.

Work out an estimate for the number of times she takes a red bead from the bag.

[4 marks]

Question 16

Here is a biased 5–sided spinner.



When the spinner is spun, it can land on red, blue, green, brown or yellow.

The table gives the probabilities that the spinner lands on red or on blue or on green.

Colour	red	blue	green	brown	yellow
Probability	0.15	0.26	0.33		

When the spinner is spun once, the probability that the spinner lands on brown is 0.06 more than the spinner lands on yellow.

Jennie spins the spinner 150 times.

Work out an estimate for the number of times the spinner lands on yellow.

[4 marks]

Question 17

In a bag there are blue discs, green discs and white discs.

There are four times as many blue discs as green discs.
number of blue discs : number of white discs = 3 : 5

One disc is selected at random.

Work out the probability that the disc is either blue or white.

[3 marks]

Question 18

A bag contains some counters.

- There are 300 counters in the bag.
- There are only red, white and blue counters in the bag.
- The probability of picking a blue counter is $\frac{23}{50}$
- The ratio of red counters to white counters is 2 : 1.

Calculate the number of red counters in the bag.

[4 marks]