

8300

GCSE MATHEMATICS

Foundation and Higher tier – Questions by Topic

Probability

Sample space diagrams (calculator)

v1.0

Name _____

Materials

For this paper you must have:

- Mathematical instruments
- You may use a calculator



Information

- The marks for questions are shown in brackets

Advice

- In all calculations, show clearly how you work out your answer

Questions 1 to 14 are **foundation** tier only

Q1.

When a spinner is spun, it shows
Blue (B) or Green (G) or Red (R) or White (W).
When a coin is tossed, it shows
Heads (H) or Tails (T).
The spinner is spun and the coin is tossed.
Complete this list of possible outcomes.

BH

(Total 2 marks)

Q2.

A code has 4 digits.
Each digit is a number from 0 to 9
Digits may be repeated.
The code starts 5 4 1

5	4	1	
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- (a) Joe chooses a number at random for the last digit.
Write down the probability that he chooses the correct number.

(1)

- (b) Amy knows the last digit is odd but **not** 7
She chooses a different odd number at random.
What is the probability that she chooses the correct number?

(1)

(Total 2 marks)

Q3.

- (a) List **all** the factors of 30.
- (b) A factor of 30 is chosen at random.
What is the probability that it is a 2-digit number?

(2)

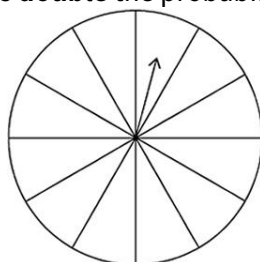
(1)

(Total 3 marks)

Q4.

A fair spinner has 12 equal sections.
Label each section A, B, C or D so that when the arrow is spun,

the probability it lands on A is $\frac{1}{6}$
the probability it lands on B is **equal** to the probability it lands on C
the probability it lands on D is **double** the probability it lands on A.



(Total 3 marks)

Q5.

In a game, players roll two ordinary, fair six-sided dice.
The numbers rolled are added to get a score.

(a) Complete the table of possible scores.

		Dice 2					
Dice 1	+	1	2	3	4	5	6
	1	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	
	4	5	6	7	8		
	5	6	7	8			
	6	7	8				

(1)

(b) What is the most likely score?

(1)

(c) To win a prize a player must score 8.

Work out the probability of winning a prize.

(2)

(Total 4 marks)

Q6.

In a game a team scores

2 points for a win

1 point for a draw

0 points for a loss.

A team plays four games.

There are six combinations of results that score **at least 5** points.

Complete the table to show these combinations.

Number of wins	Number of draws	Number of losses	Total score
4	0	0	8
3	1	0	7

(Total 3 marks)

Q7.

A lunchbox contains **one** sandwich and **one** drink from this list.

Sandwiches

Cheese (C)

Ham (H)

Prawn (P)

Drinks

Blackcurrant
(B)

Lemonade (L)

Water (W)

- (a) List **all** possible combinations.
One has been done for you.
CB

(3)

- (b) One combination is chosen at random.
What is the probability that it is Ham and Water?

(1)

(Total 4 marks)

Q8.

Beth collects this information about Year 7 sports clubs for the school newspaper.

Sports club	Number of members
Football	40
Table tennis	5
Basketball	10
Netball	15

- (a) Use the information to complete the pictogram.
The first two rows have been done for you.
Remember to complete the key.

Key:  represents _____ members

Football	
Table tennis	
Basketball	
Netball	

(3)

- (b) Use the information to write a headline about the sports clubs.

(1)

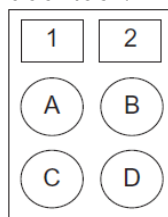
- (c) The 40 members of the football club are put into teams of five.
Each team plays a match against one of the other teams.
How many matches are played?

(2)

(Total 6 marks)

Q9.

The diagram shows a door lock.



The code is a number followed by a letter.

Steve enters a code at random.

Work out the probability that he has entered the correct code.

(Total 3 marks)

Q10.

In a college canteen students can choose

a starter and a main course **or** a main course and a pudding.

Starter	Main Course	Pudding
Soup	Curry	Jelly
	Burger	Fruit
	Pasta	

- (a) One combination is soup and curry.
How many different combinations are there?

(2)

- (b) All of the combinations are equally popular.
A student is chosen at random.
What is the probability that he has jelly?

(1)

- (c) The canteen serves 270 students one Monday.
How many jellies do they expect to serve?

(2)

(Total 5 marks)

Q11.

There are three types of Easter eggs.

Milk chocolate M

Dark chocolate D

White chocolate W

The eggs come in three sizes.

Small S

Large L

King size K

- (a) List **all** possible combinations of chocolate type and size.
The first one has been done for you.

MS

(3)

- (b) A box contains equal numbers of each egg.
One egg is chosen at random.
What is the probability that a small milk chocolate egg is chosen?

(1)

(Total 4 marks)

Q12.

A 10p coin and a 2p coin are tossed.
List **all** the possible outcomes. Use H for heads and T for tails.

(Total 2 marks)

Q13.

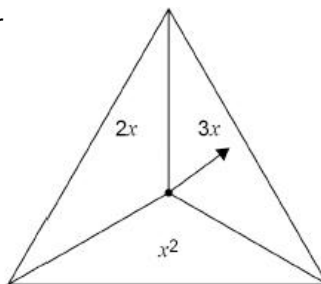
A bag contains one £5 note, one £10 note, one £20 note and one £50 note.
Amaan picks **two** of the notes at random without replacement.
Work out the probability that he has picked **at least** £30

(Total 2 marks)

Q14.

In a game,

- an ordinary fair six-sided dice is rolled
- the fair spinner shown is spun.



The score is the dice number **substituted** into the spinner expression.

(a) Complete the table to show all of the possible scores.

	1	2	3	4	5	6
$2x$				8		
$3x$		6				
x^2					25	

(2)

(b) A player wins the game if their score is 10 or more. Work out the probability that they win the game.

(1)

(c) The game is played 711 times. Estimate the number of games that are won.

(2)

(Total 5 marks)

Questions 15 to 16 are **higher** tier only

Q15.

Fair spinner A has five equal sections labelled 1, 2, 3, 4, 5.
Fair spinner B has five equal sections labelled 6, 7, 8, 9, 10.
Each spinner is spun once and the numbers are added.
Work out the probability that the total is 12 or more.

(Total 5 marks)

Q16.

Liam is trying to remember a 3-digit code. He knows the rule that
the first digit is a cube number
the second digit is a factor of 16
the third digit is an odd number.
Liam tries at random a code that matches the rule.
Work out the probability that this is the correct code.

(Total 4 marks)