GCSE Foundation 25

Handling Data

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132 minutes

128 marks

Probability

Q1. These cards are put into a hat.

One card is chosen at random.

(a) What is the probability of choosing the card with the number 7?

Answer .....

(1)

(b) What is the probability of choosing a card that has a digit 3 on it?

Answer .....

(1)

(c) What is the probability of choosing a card that does **not** have a digit 3 on it?

.....

Answer .....

(1)
(Total 3 marks)

Q2. (a) A bag had 1 black and 6 white counters.
More black counters were added to the bag.

A counter is now picked at random from the bag.
The probability it is black is now $\frac{1}{2}$.

How many black counters were added?

.....

.....

Answer .....

(1)

(b) A different bag had 7 red and 12 yellow counters.

A number of yellow counters were taken out of the bag and replaced with the same number of red counters.

The mode is now red.

What is the smallest possible number of yellow counters taken out?

.....

.....

Answer .....

(2)
(Total 3 marks)

Q3. (a) Use a suitable word from the list to complete each sentence.

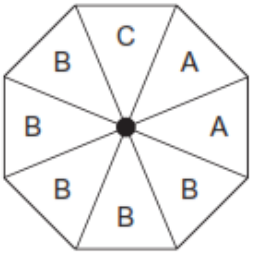
impossible unlikely evens likely certain

Rolling a 7 on a fair ordinary dice is .....

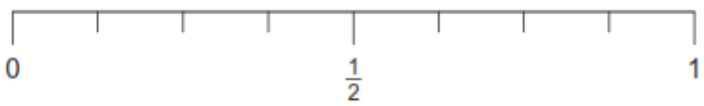
Rolling a 6 on a fair ordinary dice is .....

(2)

(b) A fair spinner has eight equal sections.



Put arrows on the scale to show the probability of landing on each letter.
Label each arrow with the correct letter.



(3)
(Total 5 marks)

Q4. The probability that Kate oversleeps is four times the probability that she does **not**.

Work out the probability that she oversleeps.

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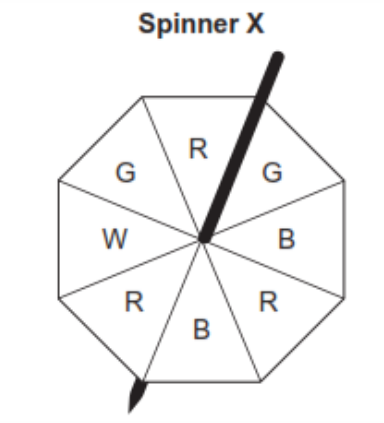
Answer .....

(Total 2 marks)

Q5. (a) Fair spinner X has eight equal sections.
The sections are either red (R), blue (B), green (G) or white (W).



(i) The spinner is spun.

On which colour is it least likely to land?

Answer .....

(1)

(ii) Write down the probability that the spinner lands on green.
Give your answer in its simplest form.

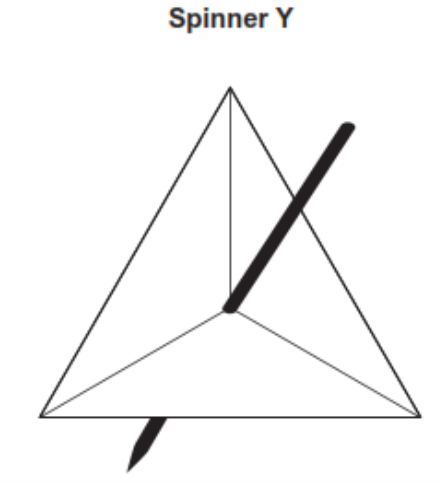
.....

Answer .....

(2)

(b) Fair spinner Y has three equal sections.
It is certain to land on red (R).

Label spinner Y.



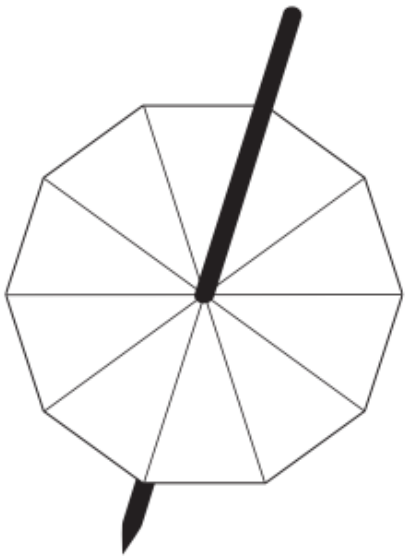
(1)

(c) Fair spinner Z has 10 equal sections.

Label spinner Z so that

it has the same four colours as spinner X
white is less likely than on spinner X
white and green are equally likely on spinner Z
red and blue are equally likely on spinner Z.

Spinner Z



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(2)
(Total 6 marks)

Q6. 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)

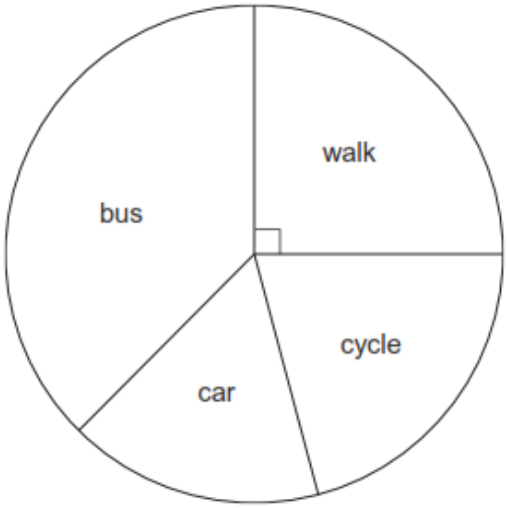
(b) A box contains equal numbers of each egg.
One egg is chosen at random.

What is the probability that a small milk chocolate egg is chosen?

Answer .....

(1)
(Total 4 marks)

Q7. The pie chart shows information about how year 10 students travel to a school.



(a) A student from year 10 is chosen at random.

Mark, with the letter, the probabilities of each of the following on the scale below.
The first one has been done for you.

A: The student walks to school.

B: The student does **not** walk to school.

C: The student travels to school by train.

(2)

(b) 40 students travel to school by car.

How many year 10 students are there?

.....

.....

.....

Answer .....

(3)

(c) There are 252 students in year 11.
The same proportion of students walk to school as in year 10.

Work out the number of year 11 students that walk to school.

.....

.....

.....

Answer .....

(2)
(Total 7 marks)

Q8. A bag only contains red and blue counters.
It contains 24 red counters.

A counter is chosen at random from the bag.
The probability of choosing a blue counter is $\frac{1}{4}$.

How many counters are in the bag?

.....

.....

.....

.....

Answer .....

(Total 3 marks)

Q9. (a) Tick the correct column for each statement.

Statement	Never True	Sometimes True	Always True
An impossible event has a probability of −1			
An event which is unlikely has a probability of 0.75			
An event which is certain has a probability of 1			

(3)

(b) Put these probabilities in order starting with the lowest.

0.3 $\frac{1}{3}$ 33%

Lowest ……

……

Highest ……

(2)
(Total 5 marks)

Q10. 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)

Q11. The table shows the weather in London each day for 40 days.

Weather	Tally	Frequency
Sun	𝍸 𝍸	
Rain	𝍸 𝍸 𝍸 |||	
Snow	||||	
Fog	𝍸 |||	
		Total = 40

(a) Complete the table.

(2)

(b) What fraction of the 40 days are sunny?
Give your answer in its simplest form.

.....

Answer .....

(2)

(c) In Manchester for the 40 days

- 16 days are sunny
- 50% of the days have rain
- there is no snow.

(i) Complete the table for Manchester.

Weather	**Frequency**
Sun	
Rain	
Snow	
Fog	
	Total = 40

(3)

(ii) One of the 40 days in Manchester is chosen at random.
Use a suitable probability **word** to complete the sentences.

The chance of choosing a day with snow is.....

The chance of choosing a day with rain is .....

(2)
(Total 9 marks)

Q12. (a) A bag contains 3 red, 5 white and 8 blue counters.
One counter is chosen at random.

What is the probability of choosing a blue counter?

.....

.....

Answer .....

(2)

(b) A different bag contains only black counters, pink counters and white counters.
When one counter is chosen at random, each colour is equally likely.

Write down **two** possible values for the total number of counters in this bag.

.....

.....

Answer ..... and .....

(2)

(c) Another bag contains only green counters and yellow counters.
There are more than 10 counters in the bag.
When one counter is chosen at random, the probability of choosing a green counter is $\frac{3}{4}$.

Write down **two** possible values for the total number of counters in this bag.

.....

.....

Answer ..... and .....

(2)
(Total 6 marks)

Q13. At the school fayre, I play a game 20 times.
Each go costs 50p.
Each time I win I receive £1.50
The probability of winning is $\frac{1}{5}$.

How much money do I expect to lose?

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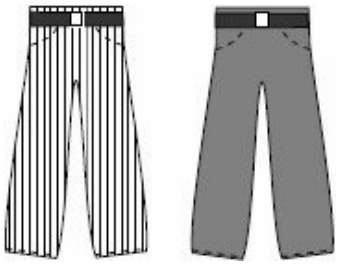
Answer £.....

(Total 3 marks)

Q14. Tommy has three T-shirts.

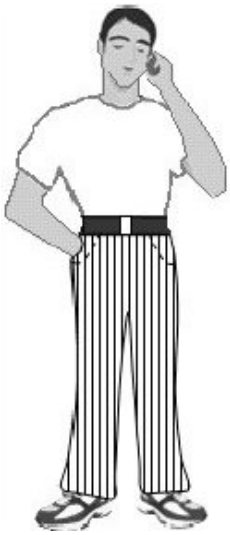
White Striped Grey

He has two pairs of jeans.



Striped Grey

Today he is wearing the white T-shirt and the striped jeans.



(a) Complete the table to show all the combinations of T-shirt and jeans that Tommy could wear.

T-shirt	Jeans
White	Striped
White	Grey

(2)

(b) One morning Tommy dressed in the dark.

He chose one T-shirt and one pair of jeans at random.

What is the probability that he chose matching T-shirt and jeans?

.....

Answer .....

(2)

(Total 4 marks)

Q15. A bag contains 6 red pens, 69 black pens and 25 blue pens.

(a) Write down the number of red pens as a fraction of the total number of pens in the box.

Give your answer in its simplest form.

.....

.....

Answer .....

(2)

(b) What percentage of the pens are **not** black?

.....

Answer .....%

(1)

(c) Circle a word from the list to describe the chance of each of the following events.

(i) A pen chosen at random from the box is red.

impossible unlikely evens likely certain

(1)

(ii) A pen chosen at random from the box is **not** green.

impossible unlikely evens likely certain

(1)

(Total 5 marks)

Q16. Ronan is designing a game.

He has two sets of discs laid face down on a table.

The first set of five discs are labelled 1, 3, 5, 7, 9.

The second set of four discs are labelled 2, 4, 6, 8.

Players turn over one disc, at random, from each set and add the numbers together.

(a) Complete the table to show **all** the possible totals.

	1	3	5	7	9
2	3	5	7		
4	5				
6					
8					

(2)

(b) What is the probability of getting a total less than six?

.....

Answer .....

(1)

(c) Ronan uses the game to raise money for charity.

Each player pays 20 p to play the game.

If a player gets a total of exactly 13 they win a bar of chocolate.

It costs Ronan 50 p for each bar of chocolate.

If 100 people play the game, show that Ronan should expect to raise £12.50 for charity.

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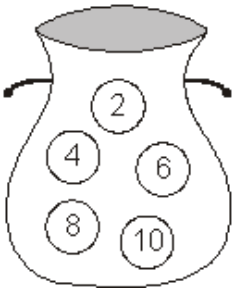
(4)
(Total 7 marks)

Q17. A bag contains five discs as shown.



One disc is taken from the bag at random.
It is then replaced.
Another disc is then taken from the bag at random.
The numbers on the two discs are added to make a score.

(a) Complete the table of scores.

+	**2**	**4**	**6**	**8**	**10**
2	4	6	8		
4	6	8			
6	8				
8					18
10				18	20

(1)

(b) What is the probability that the score is 16?

.....

.....

Answer .....

(2)

(c) Which is greater

the probability that the score is a square number

or

the probability that the score is a cube number?

You **must** explain your answer.

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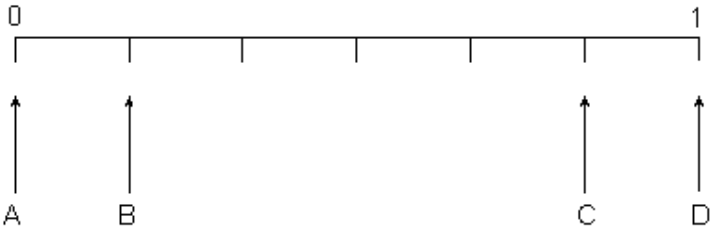
(2)

(Total 5 marks)

Q18. The diagram shows a probability scale.



An ordinary fair six-sided dice is rolled.

(a) Which arrow represents the probability of rolling a 5?

Answer .....

(1)

(b) Which arrow represents the probability of rolling a number less than 7?

Answer .....

(1)

(c) Draw an arrow on the scale to represent the probability of rolling an odd number.

(1)

(Total 3 marks)

Q19. (a) Circle the **two** fractions in the list that have the same value as $\frac{1}{4}$.

$\frac{2}{8}$ $\frac{3}{10}$ $\frac{4}{12}$ $\frac{5}{25}$ $\frac{6}{24}$

(2)

(b) Write $\frac{1}{4}$ as a percentage.

Answer ..... %

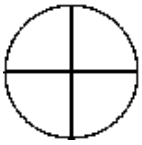
(1)

(c) Which of these words best describes an event with a probability of $\frac{3}{4}$?

Circle the correct answer.

impossible unlikely likely certain

(1)

(d) In a pictogram the symbol  represents 20 people.

Draw a symbol that would represent 5 people.

(1)

(Total 5 marks)

Q20. Two fair dice are rolled in a game.
The score is the **difference** between the numbers shown on the dice.
The table shows some of the possible scores.

		First dice					
		1	**2**	**3**	**4**	**5**	**6**
Second dice	**1**	0	1	2			
	2	1	0				
	3	2					
	4						
	5						
	6						

(a) Explain how a score of 0 can be obtained.

.....

.....

(1)

(b) Complete the table.

.....

.....

(2)

(c) Bethany works out the chances of scores occurring.

(i) She says that 1 is the most common score.

What is the probability of a score of 1?

.....

Answer .....

(1)

(ii) She works out that another score has a probability of $\frac{1}{18}$

What is this score?

.....

Answer .....

(1)

(Total 5 marks)

Q21. Here is a list of numbers.

5 7 5 6 4 9 8 10 5

(a) Work out the median.

.....

Answer .....

(2)

(b) One of the numbers is chosen at random.

(i) What is the probability that the number is 5?

.....

Answer .....

(1)

(ii) Put these events in order of likelihood starting with the least likely.

A The number is 5.

B The number is even.

C The number is greater than 8.

.....

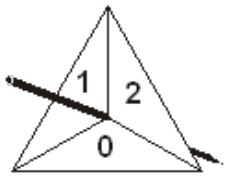
.....

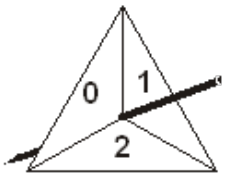
Answer .....

(2)

(Total 5 marks)

Q22. Ramesh uses two identical, fair 3-sided spinners in a game.





He spins both spinners.
His score is the two numbers multiplied together.

(a) Show his possible scores in the table.

First spinner

X	**0**	**1**	**2**
0			
1			
2			

Second spinner

(2)

(b) Ramesh says:

"I can only get four possible different scores, one of which is 0. Therefore the probability of a score of 0 is $\frac{1}{4}$"

Explain why Ramesh is wrong.

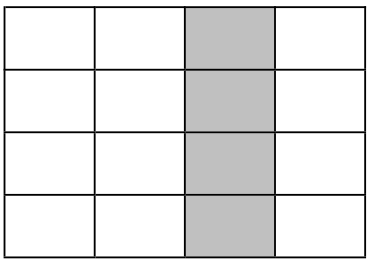
.....

.....

.....

(1)
(Total 3 marks)

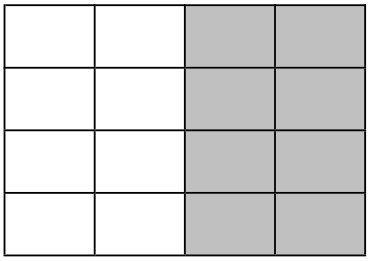
Q23. (a) What fraction of this grid is shaded?



Answer .....

(1)

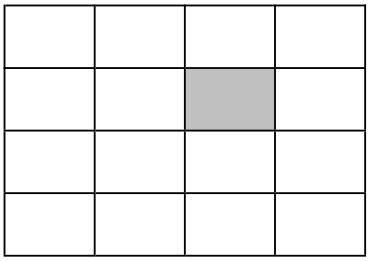
(b) What percentage of this grid is shaded?



Answer .....%

(1)

(c) A fly lands on this grid at random.



Circle the word that best describes the chance that the fly lands on the shaded square.

Impossible Unlikely Likely Certain

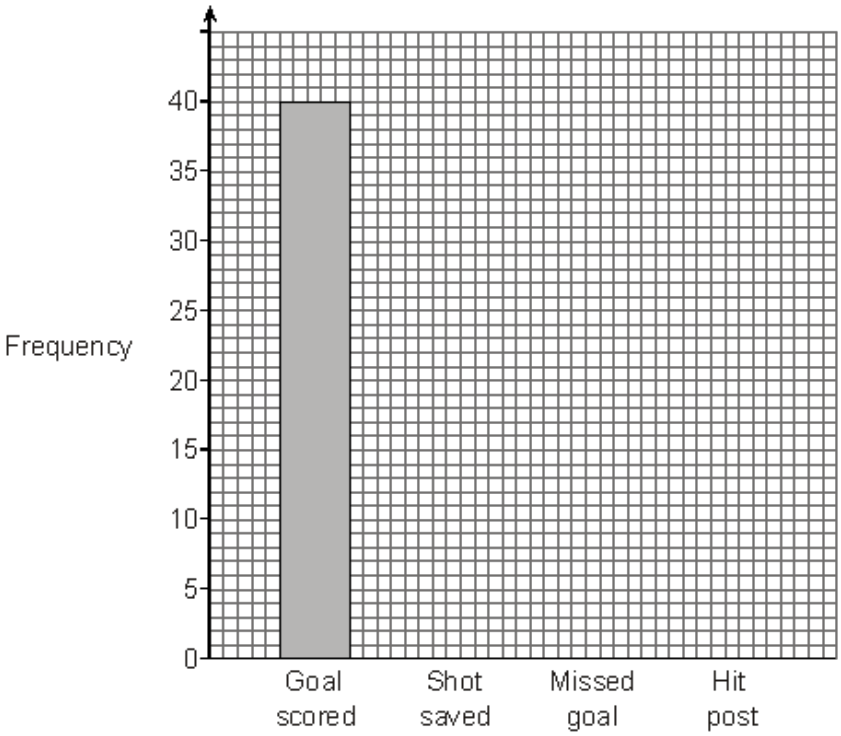
(1)

(Total 3 marks)

Q24. The table shows the results of 60 penalty kicks taken in the Premier League in one season.

Outcome	**Frequency**
Goal scored	40
Shot saved	8
Missed goal	10
Hit post	2

(a) Complete the bar chart to show this information.



(3)

(b) One of these 60 penalty kicks is chosen at random.

Write down the probability that a goal is scored.
Give your answer as a fraction in its simplest form.

.....

Answer .....

(2)

(c) Andy says that 20% of the penalty kicks either missed the goal or hit the post.

Is Andy correct?
You **must** show your working.

.....

.....

.....

(3)
(Total 8 marks)

Q25. Two fair dice are thrown and their scores added together.
The table shows some of the possible totals.

+	**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	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	

(a) Fill in the missing number in the table.

(1)

(b) (i) Work out the probability that the total is 6.

.....

Answer .....

(1)

(ii) Work out the probability that the numbers on the dice are the same.

.....

Answer .....

(1)

(iii) Work out the probability that the total is a square number.

.....

Answer .....

(2)

(Total 5 marks)

Q26. A girls' basketball team plays six matches.
The scores are

28 30 25 35 39 26

(a) What is the median score?

.....

Answer .....

(2)

(b) What is the mean score?

.....

.....

.....

Answer .....

(3)

(c) These are the members of the team.

One girl is to be chosen at random to be captain.
What is the probability that her name begins with J?

.....

Answer .....

(2)
(Total 7 marks)

Q27. Sarah is playing a game with a fair coin and a fair six-sided dice.
She spins the coin and then throws the dice.

If the coin shows heads Sarah's score is 1 **more** than the number shown on the dice. If the coin shows tails Sarah's score is 2 **less** than the number shown on the dice.

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

		Dice					
		1	**2**	**3**	**4**	**5**	**6**
Coin	**Heads**				5		
	Tails	–1					

(2)

(b) Work out the probability that Sarah's score is

(i) negative

Answer .....

(1)

(ii) more than 3.

.....

.....

Answer .....

(2)

(Total 5 marks)