Chhetri Academy

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GCSE MATHS

Probability

Edexcel 1MA1 | Subtopic collection Topic 52

Probability and relative frequency

Higher tier

Past paper question booklet

130	2003-2025	Higher
question groups	available papers	tier

Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

22. A bag contains 3 black beads, 5 red beads and 2 green beads.
Gianna takes a bead at random from the bag, records its colour and replaces it.
She does this two more times.

Work out the probability that, of the three beads Gianna takes, exactly two are the same colour.

.....

(5)

19. The probability that Betty will be late for school tomorrow is 0.05
The probability that Colin will be late for school tomorrow is 0.06

The probability that both Betty and Colin will be late for school tomorrow is 0.011

Fred says that the events 'Betty will be late tomorrow' and 'Colin will be late tomorrow' are independent.

Justify whether Fred is correct or not.

.....

.....

.....

(2)

Page Total

3. The grouped frequency table shows information about the weights, in kilograms, of 20 students, chosen at random from Year 11.

Weight (w kg)	Frequency
$50 \leq w < 60$	7
$60 \leq w < 70$	8
$70 \leq w < 80$	3
$80 \leq w < 90$	2

There are 300 students in Year 11.

Work out an estimate for the number of students in Year 11 whose weight is between 50 kg and 60 kg.

.....

(3)

12. Mathstown College has 500 students, all of them in the age range 16 to 19.
The incomplete table shows information about the students.

Age (years)	Number of male students	Number of female students
16	50	30
17	60	40
18	76	54
19		

A newspaper reporter is carrying out a survey into students' part-time jobs.
She takes a sample, stratified both by age and by gender, of 50 of the 500 students.

(a) Calculate the number of 18 year old male students to be sampled.

.....
(3)

In the sample, there are 9 female students whose age is 19 years.

(b) Work out the least number of 19 year old female students in the college.

.....
(2)

A newspaper photographer is going to take photographs of two students from Mathstown College.

He chooses
one student at random from all of the 16 year old students and
one student at random from all of the 17 year old students.

(c) Calculate the probability that he will choose two female students.

.....
(3)

19. Joan has two boxes of chocolates.
The boxes are labelled **A** and **B**.

Box **A** contains 15 chocolates. There are 6 plain, 4 milk and 5 white chocolates.
Box **B** contains 12 chocolates. There are 4 plain, 3 milk and 5 white chocolates.

Joan takes one chocolate at random from each box.
Work out the probability that the two chocolates Joan takes are not of the same type.

.....

(4)

3. The probability that a biased dice will land on a four is 0.2

Pam is going to roll the dice 200 times.

(a) Work out an estimate for the number of times the dice will land on a four.

.....

(2)

The probability that the biased dice will land on a six is 0.4
Ted rolls the biased dice once.

(b) Work out the probability that the dice will land on either a four or a six.

.....

(2)

19. (a) (i) Factorise $2x^2 - 35x + 98$

.....

(ii) Solve the equation $2x^2 - 35x + 98 = 0$

.....

(3)

A bag contains $(n + 7)$ tennis balls.
n of the balls are yellow.
The other 7 balls are white.

John will take at random a ball from the bag.
He will look at its colour and then put it back in the bag.

(b) (i) Write down an expression, in terms of n, for the probability that John will take a white ball.

.....

Bill states that the probability that John will take a white ball is $\frac{2}{5}$

(ii) Prove that Bill's statement cannot be correct.

(3)

Blank

After John has put the ball back into the bag, Mary will then take at random a ball from the bag.
She will note its colour.

(c) Given that the probability that John and Mary will take balls with **different** colours is $\frac{4}{9}$,
prove that $2n^2 - 35n + 98 = 0$

(5)

(d) Using your answer to part (a) (ii) or otherwise, calculate the probability that John and Mary will both take white balls.

.....

(2)

Page Total

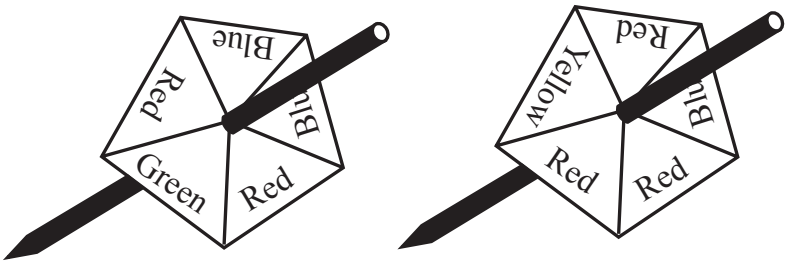
16. Jeremy designs a game for a school fair.

He has two 5-sided spinners.
The spinners are equally likely to land on each of their sides.

One spinner has 2 red sides, 1 green side and 2 blue sides.
The other spinner has 3 red sides, 1 yellow side and 1 blue side.

(a) Calculate the probability that the two spinners will land on the same colour.

.....
(3)



The game consists of spinning each spinner once.
It costs 20p to play the game.

To win a prize both spinners must land on the same colour.
The prize for a win is 50p.

100 people play the game.

(b) Work out an estimate of the profit that Jeremy should expect to make.

£ .....
(2)

(Total 5 marks)

Q16

1. Mr Brown makes some compost.
He mixes soil, manure and leaf mould in the ratio 3:1:1

Mr Brown makes 75 litres of compost.

(a) How many litres of soil does he use?

..... litres
(3)

Mr Brown sows 200 flower seeds.

For each flower seed the probability that it will produce a flower is 0.8

(b) Work out an estimate for the number of these flower seeds that will produce a flower.

.....
(2)

Q1

(Total 5 marks)

1. A bag contains counters which are red or green or yellow or blue.

The table shows each of the probabilities that a counter taken at random from the bag will be red or green or blue.

Colour	**Red**	**Green**	**Yellow**	**Blue**
Probability	0.2	0.3		0.1

A counter is to be taken at random from the bag.

(a) Work out the probability that the counter will be yellow.

.....

(2)

The bag contains 200 counters.

(b) Work out the number of red counters in the bag.

.....

(2) **Q1**

(Total 4 marks)

13. Sarah wants to survey students in her school about which vegetables they eat.

These vegetables are on the menu in the school canteen.

carrots peas cauliflower broccoli swede

(a) Design a suitable question she could use for a questionnaire to find out which of these vegetables each student eats.

(2)

There are 800 students in Sarah's school.

Sarah selects 50 students at random.
30 of these 50 students eat carrots.

(b) Work out an estimate for the number of students in Sarah's school who eat carrots.

.....

(2) **Q13**

(Total 4 marks)

1. The two-way table gives some information about how 100 children travelled to school one day.

	Walk	Car	Other	Total
Boy	15		14	54
Girl		8	16	
Total	37			100

(a) Complete the two-way table.

(3)

One of the children is picked at random.

(b) Write down the probability that this child walked to school that day.

.....

(1)

(Total 4 marks)

Q1

26. Phil has 20 sweets in a bag.

5 of the sweets are orange.
7 of the sweets are red.
8 of the sweets are yellow.

Phil takes at random **two** sweets from the bag.

Work out the probability that the sweets will **not** be the same colour.

.....

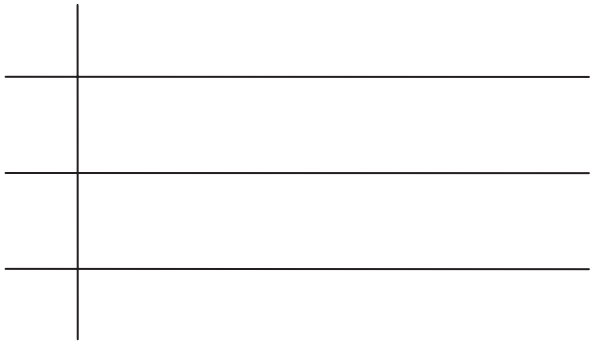
Q26

(Total 4 marks)

5. Here are the weights in grams, to the nearest gram, of 15 eggs.

33	46	41	54	51
38	60	44	55	51
62	55	52	37	63

(a) Complete the ordered stem and leaf diagram to show this information.
You must include a key.



Key

(3)

Meg is going to pick at random one of the eggs.

(b) Work out the probability that this egg will have a weight of more than 45 grams.

.....

(2)

Q5

(Total 5 marks)

Blank

26. There are 3 orange sweets, 2 red sweets and 5 yellow sweets in a bag.

Sarah takes a sweet at random.
She eats the sweet.
She then takes another sweet at random.

Work out the probability that both the sweets are the same colour.

.....

Q26

(Total 4 marks)

10. There are some ribbons in a box.
The ribbons are green or red or yellow or white.

The table shows each of the probabilities that a ribbon chosen at random will be green or red or white.

Colour	**Green**	**Red**	**Yellow**	**White**
Probability	0.15	0.30		0.35

(a) Work out the probability that a ribbon chosen at random will be yellow.

.....
(2)

There are 500 ribbons in the box.

(b) Work out the number of red ribbons.

.....
(2)

(Total 4 marks)

Q10

Blank

24. (a) Explain what is meant by a random sample.

.....

.....

(1)

Chris collects stamps from different countries.
He has 245 stamps from France.

He wants to take a random sample of 10 of his stamps from France.

(b) Describe a method that Chris could use.

.....

.....

.....

(1)

The table shows information about Chris' collection of 662 stamps.

Country	France	Germany	Spain	Italy	Total
Number of stamps	245	184	138	95	662

Chris takes a sample of 50 stamps stratified by country.

(c) Work out the number of stamps from Italy in this sample.

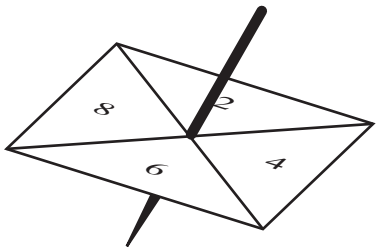
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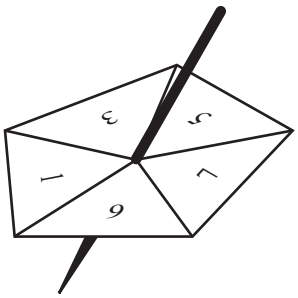
(2)

(Total 4 marks)

Q24

3. Louise spins a four-sided spinner and a five-sided spinner.





The four-sided spinner is labelled 2, 4, 6, 8
The five-sided spinner is labelled 1, 3, 5, 7, 9

Louise adds the score on the four-sided spinner to the score on the five-sided spinner.
She records the possible total scores in a table.

4-sided spinner

5-sided spinner	+	2	4	6	8
	1	3	5	7	9
	3	5	7	9	11
	5	7	9	11	13
	7	9	11		
	9	11	13		

(a) Complete the table of possible total scores.

(1)

(b) Write down all the ways in which Louise can get a total score of 11
One way has been done for you.

(2, 9) .....

(2)

Both spinners are fair.

(c) Find the probability that Louise's total score is less than 6

.....

(2)

(Total 5 marks)

Q3

2. A spinner can land on red or blue or pink.
The table shows the probabilities that the spinner will land on red or on blue.

Colour	red	blue	pink
Probability	0.58	0.30	

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

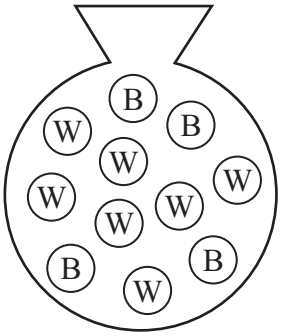
Q2

.....

(Total 2 marks)

Blank

26. There are 11 buttons in a bag.



7 buttons are white.
4 buttons are black.

Harley takes a button at random from the bag, and keeps it.

She now takes another button at random from the bag.

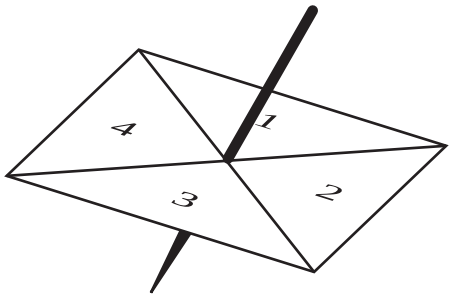
Work out the probability that Harley takes a button of each colour.

Q26

.....

(Total 3 marks)

1 Laura has a four-sided spinner.
The spinner is biased.



The table shows each of the probabilities that the spinner will land on 1 or land on 3
The probability that the spinner will land on 2 is equal to the probability that it will land on 4

Number	1	2	3	4
Probability	0.25		0.35	

Laura is going to spin the spinner once.

(a) Work out the probability that the spinner will **not** land on 1

.....

(2)

(b) Work out the probability that the spinner will land on 2

.....

(2)

(Total for Question 1 is 4 marks)

10 The table gives some information about the weights, in kg, of 50 suitcases at an airport check-in desk.

Weight (w kg)	Frequency
$0 < w \leqslant 10$	16
$10 < w \leqslant 15$	18
$15 < w \leqslant 20$	10
$20 < w \leqslant 35$	6

(a) Work out an estimate for the mean weight.

..... kg

(4)

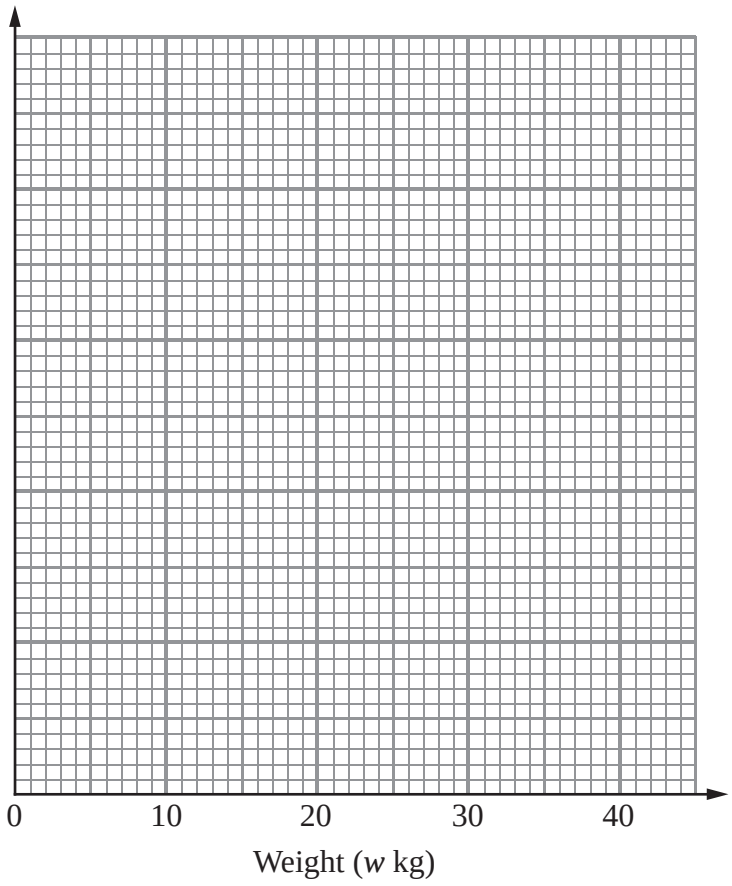
Passengers have to pay extra money for any suitcase that weighs more than 20 kg.
Two of the 50 suitcases are chosen at random.

(b) Work out the probability that both suitcases weigh more than 20 kg.

.....

(2)

(c) On the grid, draw a histogram for the information in the table.



(3)

(Total for Question 10 is 9 marks)

11 A factory makes 600 laptops.
Mrs Green is responsible for checking these laptops.
She is going to take a random sample of 80 of the laptops.

(a) Describe a method she could use to select the sample.

.....

.....

(1)

Mrs Green finds that 3 of the 80 laptops are faulty.

(b) Work out an estimate for how many of the 600 laptops are faulty.

.....

(2)

(Total for Question 11 is 3 marks)

5 The probability that a seed will grow into a flower is 0.85
Loren plants 800 seeds.

Work out an estimate for the number of these seeds that will grow into flowers.

.....

(Total for Question 5 is 2 marks)

9 Mary plays a game of throwing a ball at a target.

The table shows information about the probability of each possible score.

Score	0	1	2	3	4	5
Probability	0.09	x	$3x$	0.16	0.21	0.30

Mary is 3 times as likely to score 2 points than to score 1 point.

(a) Work out the value of x.

.....

(3)

Mary plays the game twice.

(b) Work out the probability of Mary scoring a total of 8

.....

(3)

(Total for Question 9 is 6 marks)

1. Each student at a college studies one of four languages.

The table shows the probability a student chosen at random studies German or Russian or French.

Language	German	Spanish	Russian	French
Probability	0.2		0.1	0.5

A student is chosen at random.

(a) Work out the probability that the student studies Spanish.

.....
(2)

There are 800 students at the college.

(b) Work out the number of students who study German.

.....
(2)

Q1

(Total 4 marks)

24. There are 5 red pens, 3 blue pens and 2 green pens in a box.

Gary takes at random a pen from the box and gives the pen to his friend.
Gary then takes at random another pen from the box.

Work out the probability that both pens are the same colour.

.....

Q24

(Total 4 marks)

5 Denzil has a 4-sided spinner.
The sides of the spinner are numbered 1, 2, 3 and 4
The spinner is biased.

The table shows each of the probabilities that the spinner will land on 1, on 3 and on 4
The probability that the spinner will land on 3 is x.

Number	1	2	3	4
Probability	0.3		x	0.1

(a) Find an expression, in terms of x, for the probability that the spinner will land on 2
Give your answer in its simplest form.

.....

(2)

(b) Write down the probability that the spinner will land on either 1 or 4

.....

(1)

Denzil spins the spinner 300 times.

(c) Write down an expression, in terms of x, for the number of times the spinner is likely to land on 3

.....

(1)

(Total for Question 5 is 4 marks)

1 There are yellow discs, red discs, blue discs and green discs in a bag.
Dinesh is going to take at random a disc from the bag.

The table shows each of the probabilities that Dinesh will take a red disc, or a blue disc, or a green disc.

Colour	yellow	red	blue	green
Probability		0.40	0.25	0.15

(a) Work out the probability that he will take a yellow disc.

.....

(2)

Dinesh takes at random a disc from the bag.
He writes down the colour of the disc.
He puts the disc back into the bag.

He will do this 60 times.

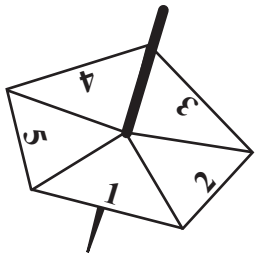
(b) Work out an estimate for the number of times he takes a red disc from the bag.

.....

(2)

(Total for Question 1 is 4 marks)

3 Here is a five-sided spinner.



The table shows the probabilities that the spinner will land on 1 or 2 or 3 or 4 or 5

Number	1	2	3	4	5
Probability	0.15	0.20	0.10	0.25	0.30

Pete spins the spinner once.

(a) Work out the probability that the spinner will land on a number greater than 2

.....

(2)

Elinor is going to spin the spinner 200 times.

(b) Work out an estimate for the number of times the spinner will land on 5

.....

(2)

(Total for Question 3 is 4 marks)

13 Isobel plays a game against Eric.

Isobel is twice as likely as Eric to win the game.
The probability that the game is drawn is 0.1

(a) Work out the probability that Eric wins the game.

.....

(2)

Isobel and Eric play the game three times.

(b) Work out the probability that all three games are drawn.

.....

(2)

(c) Work out the probability that Eric wins at least one of the three games.

.....

(3)

(Total for Question 13 is 7 marks)

12 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.

.....

(Total for Question 12 is 2 marks)

23 (a) Max wants to take a random sample of students from his year group.

(i) Explain what is meant by a random sample.

.....

.....

.....

(ii) Describe a method Max could use to take his random sample.

.....

.....

.....

(2)

(b) The table below shows the numbers of students in 5 year groups at a school.

Year	Number of students
9	239
10	257
11	248
12	190
13	206

Lisa takes a stratified sample of 100 students by year group.

Work out the number of students from Year 9 she has in her sample.

.....

(2)

(Total for Question 23 is 4 marks)

25 Carolyn has 20 biscuits in a tin.

She has

12 plain biscuits
5 chocolate biscuits
3 ginger biscuits

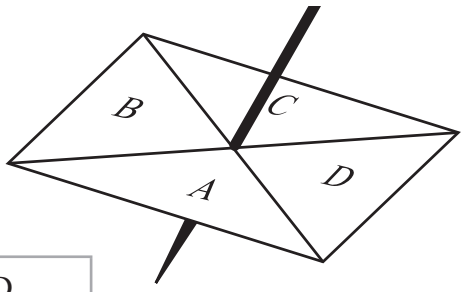
Carolyn takes at random two biscuits from the tin.

Work out the probability that the two biscuits were **not** the same type.

.....

(Total for Question 25 is 4 marks)

1 Sandy has a 4-sided spinner.
The sides of the spinner are labelled A, B, C and D.
The spinner is biased.



The table shows the probability that the spinner will land on A or on B or on C.

Side	A	B	C	D
Probability	0.15	0.32	0.27	

(a) Work out the probability that the spinner will land on D.

.....

(2)

Sandy spins the spinner 300 times.

(b) Work out an estimate for the number of times the spinner will land on A.

.....

(2)

(Total for Question 1 is 4 marks)

Question 36

11 There are N beads in a jar.
40 of these beads are black.

Julie takes at random a sample of 50 beads from the jar.
5 of the beads in her sample are black.

Work out an estimate for the value of N.

.....

(Total for Question 11 is 2 marks)

8 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.

(a) Work out the probability that Tania takes a white counter.

.....

(2)

There are 240 counters in the bag.

(b) Work out the number of red counters in the bag.

.....

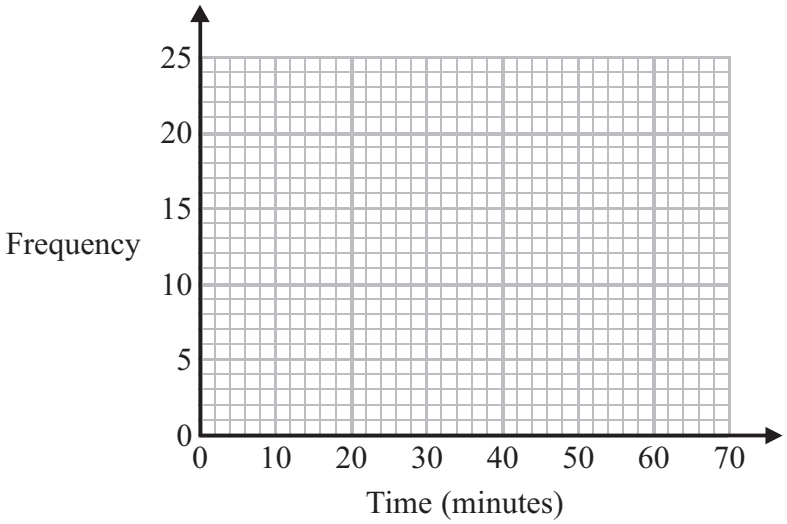
(2)

(Total for Question 8 is 4 marks)

12 The frequency table gives information about the times it took some office workers to get to the office one day.

Time (t minutes)	Frequency
$0 < t \leqslant 10$	4
$10 < t \leqslant 20$	8
$20 < t \leqslant 30$	14
$30 < t \leqslant 40$	16
$40 < t \leqslant 50$	6
$50 < t \leqslant 60$	2

(a) Draw a frequency polygon for this information.



(2)

(b) Write down the modal class interval.

.....

(1)

One of the office workers is chosen at random.

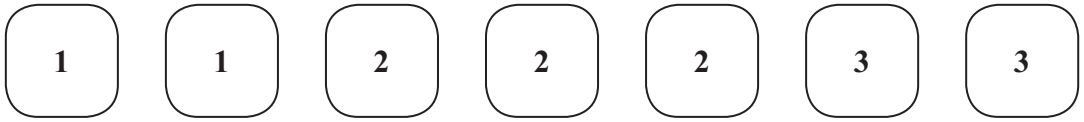
(c) Work out the probability that this office worker took more than 40 minutes to get to the office.

.....

(2)

(Total for Question 12 is 5 marks)

21 Here are seven tiles.



Jim takes at random a tile.
He does **not** replace the tile.

Jim then takes at random a second tile.

(a) Calculate the probability that both the tiles Jim takes have the number 1 on them.

.....

(2)

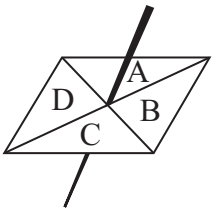
(b) Calculate the probability that the number on the second tile Jim takes is greater than the number on the first tile he takes.

.....

(3)

(Total for Question 21 is 5 marks)

2 Here is a four-sided spinner.
The sides of the spinner are labelled A, B, C and D.



The table shows the probability that the spinner will land on A or on B or on D.

Letter	A	B	C	D
Probability	0.12	0.39		0.18

Amber spins the spinner once.

(a) Work out the probability that the spinner will land on C.

.....

(2)

Lucy is going to spin the spinner 50 times.

(b) Work out an estimate for the number of times the spinner will land on A.

.....

(2)

(Total for Question 2 is 4 marks)

Question 41

7 There are female and male students at a disco.

One of these students is chosen at random.

The probability that this student is male is $\frac{2}{5}$

There are 96 female students at the disco.

Work out the total number of students at the disco.

.....

(Total for Question 7 is 3 marks)

13 The table gives information about the number of students at a school.

Year 9	Year 10	Year 11	Total
244	315	181	740

Priya is going to survey 60 of the students in the school.
She is going to use a sample stratified by year group.

(a) Work out the number of year 9, year 10 and year 11 students Priya should have in her sample.
You must show all your working.

Year 9 .....

Year 10 .....

Year 11 .....

(3)

Priya is going to use a random sample to select the students.

(b) (i) Explain what is meant by a random sample.

.....

.....

(ii) Describe how Priya could take a random sample.

.....

.....

(2)

(Total for Question 13 is 5 marks)

16 There are ten pens in a box.

4 of the pens are red.
6 of the pens are black.

Josh takes at random a pen from the box.
He puts the pen into his bag.
He then takes at random another pen from the box.

Work out the probability that Josh takes one pen of each colour.

.....

(Total for Question 16 is 4 marks)

24 There are three different types of sandwiches on a shelf.

There are
4 egg sandwiches,
5 cheese sandwiches
and 2 ham sandwiches.

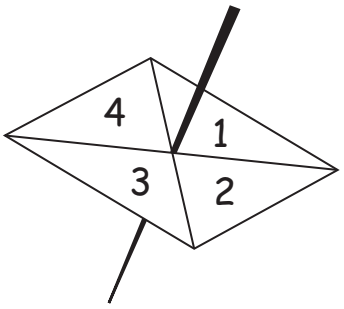
Erin takes at random 2 of these sandwiches.

Work out the probability that she takes 2 different types of sandwiches.

.....

(Total for Question 24 is 5 marks)

4 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

(a) Work out the probability that the spinner will land on 4

.....

(3)

Shunya is going to spin the spinner 200 times.

(b) Work out an estimate for the number of times the spinner will land on 3

.....

(2)

(Total for Question 4 is 5 marks)

Question 46

2 The probability that a pea plant will grow from a seed is 93%.

Sarah plants 800 seeds.

Work out an estimate for the number of seeds that will grow into pea plants.

.....

(Total for Question 2 is 2 marks)

15 Lily and Anna take a test.

The probability that Lily will pass the test is 0.6

The probability that Anna will pass the test is 0.8

(a) Work out the probability that both of these girls fail the test.

.....

(3)

(b) Work out the probability that both of these girls pass the test or that both of these girls fail the test.

.....

(3)

(Total for Question 15 is 6 marks)

26 Fiza has 10 coins in a bag.
There are three £1 coins and seven 50 pence coins.

Fiza takes at random, 3 coins from the bag.

Work out the probability that she takes exactly £2.50

.....

(Total for Question 26 is 4 marks)

4 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.

.....

(Total for Question 4 is 3 marks)

15 Jeremy has 10 socks.

6 of the socks are red
2 of the socks are blue
2 of the socks are green

Jeremy takes at random two of the socks.

Work out the probability that he takes two socks of the same colour.

.....

(Total for Question 15 is 4 marks)

5 Jane has a packet of seeds.
The probability that a seed will grow is 0.75

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

.....

(1)

Jane plants 200 of these seeds.

(b) Estimate the number of the seeds that will grow.

.....

(2)

(Total for Question 5 is 3 marks)

19 In a supermarket, the probability that John buys fruit is 0.7

In the same supermarket, the probability that John independently buys vegetables is 0.4

Work out the probability that John buys fruit or buys vegetables or buys both.

.....

(Total for Question 19 is 3 marks)

3 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?

.....

(Total for Question 3 is 2 marks)

2 Tim plays a game.
He can win the game or he can lose the game or he can draw the game.

The probability that Tim will win the game is 0.25
The probability that Tim will lose the game is x.

(a) Give an expression, in terms of x, for the probability that he will draw the game.

.....

(2)

Tim plays the game 240 times.

(b) Work out an estimate for the number of times he will win the game.

.....

(2)

(Total for Question 2 is 4 marks)

16 There are 11 girls and 8 boys in a tennis club.

Jake is going to pick at random a team from the tennis club.
The team will have two players.

Work out the probability that Jake will pick two boys or two girls for the team.

.....

(Total for Question 16 is 4 marks)

8 Lorna carries out a survey about the number of times customers go to a shop.

She asks at random 100 customers how many times they went to the shop last month.

The table shows Lorna's results.

Number of times	0	1	2	3	4	5	6	more than 6
Frequency	4	12	13	17	25	13	11	5

One of the 100 customers is chosen at random.

(a) What is the probability that this customer went to the shop 5 or more times?

.....

(2)

Last month the shop had a total of 1500 customers.

(b) Work out an estimate for the number of customers who went to the shop exactly 2 times last month.

.....

(2)

The owner of a different shop is carrying out a survey on the ages of his customers.
He records the ages of the first 10 customers in his shop after 9 am one morning.

(c) This may **not** be a suitable sample.
Give **two** reasons why.

1 .....

.....

2 .....

.....

(2)

(Total for Question 8 is 6 marks)

***22** Shabeen has a biased coin.
The probability that the coin will land on heads is 0.6

Shabeen is going to throw the coin 3 times.

She says the probability that the coin will land on tails 3 times is less than 0.1

Is Shabeen correct?
You must show all your working.

(Total for Question 22 is 3 marks)

Question 58

5 There are 20 sweets in a box.
x of the sweets are red.
The rest of the sweets are yellow.

Tom takes at random a sweet from the box.

Write down an expression, in terms of x, for the probability that Tom takes a yellow sweet.

.....

(Total for Question 5 is 2 marks)

15 There are 10 cakes on a plate.

1 fruit slice
6 doughnuts
3 iced buns

Barry takes a cake at random and eats it.
He then takes at random a second cake.

Work out the probability that Barry takes two different types of cake.

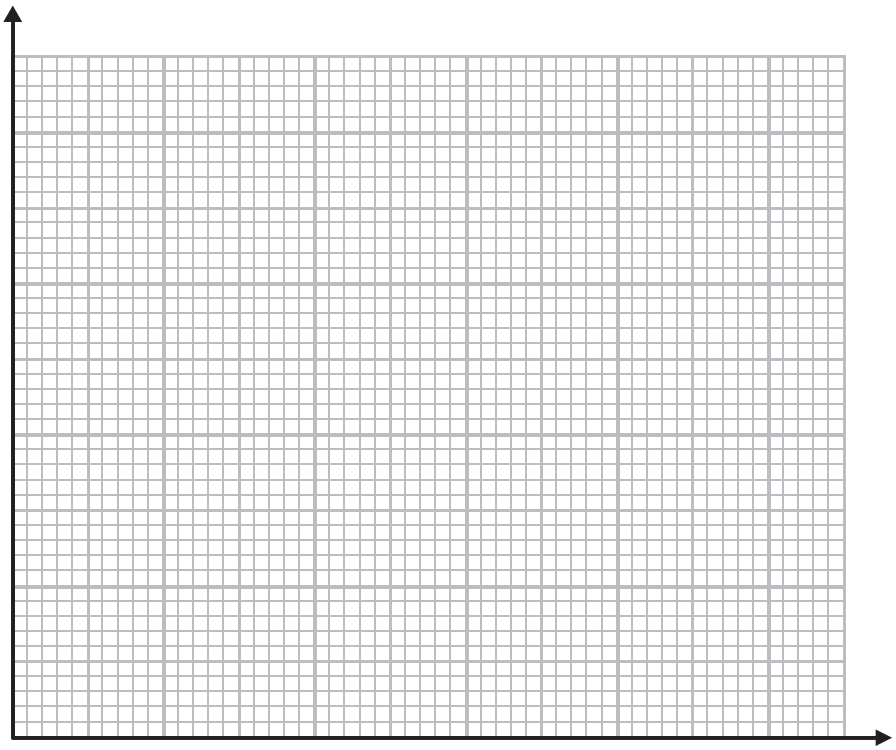
.....

(Total for Question 15 is 4 marks)

16 The table shows some information about the total rainfall, in millimetres, recorded at 85 weather stations one month.

Rainfall (mm)	Frequency
$0 < x \leqslant 20$	16
$20 < x \leqslant 30$	27
$30 < x \leqslant 45$	36
$45 < x \leqslant 50$	6

(a) Draw a histogram for this information.



(3)

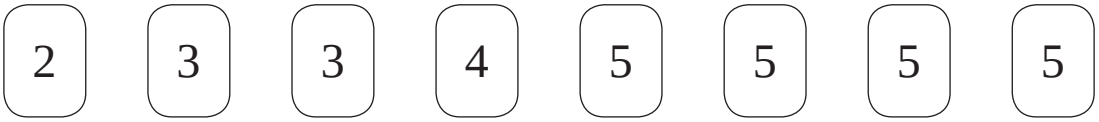
(b) One of the weather stations is selected at random.
Work out the probability that the rainfall recorded was over 40 mm.

.....

(3)

(Total for Question 16 is 6 marks)

23 Paul has 8 cards.
There is a number on each card.



Paul takes at random 3 of the cards.
He adds together the 3 numbers on the cards to get a total T.

Work out the probability that T is an odd number.

.....

(Total for Question 23 is 4 marks)

5 There are some green counters, some yellow counters, some blue counters and some red counters in a bag.

The table shows the probabilities that a counter taken at random from the bag will be green or yellow or red.

Colour	Green	Yellow	Blue	Red
Probability	0.16	0.4		0.24

Mary takes at random a counter from the bag.

(a) Work out the probability that the counter will be blue.

.....

(2)

Mary puts the counter back into the bag.
There are 125 counters in the bag.

(b) Work out the number of green counters in the bag.

.....

(2)

(Total for Question 5 is 4 marks)

5 There are only red counters, yellow counters, blue counters and green counters in a bag.
Olu takes at random a counter from the bag.

The table shows each of the probabilities.

Colour	**Red**	**Yellow**	**Blue**	**Green**
Probability	0.6	0.25	$2x$	x

The probability that Olu will take a blue counter is twice the probability that he will take a green counter.

(a) Work out the value of x.

.....

(3)

Olu takes a counter from the bag.
He writes down the colour of the counter.
He puts the counter back in the bag.

Olu does this 50 times.

(b) Work out an estimate for the number of times that Olu takes a red counter from the bag.

.....

(2)

(Total for Question 5 is 5 marks)

11 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.

(a) Work out the probability that Ali will win the game.

.....

(2)

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.

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

.....

(3)

(Total for Question 11 is 5 marks)

19 There are n sweets in a bag.
6 of the sweets are orange.
The rest of the sweets are yellow.

Hannah takes at random a sweet from the bag.
She eats the sweet.

Hannah then takes at random another sweet from the bag.
She eats the sweet.

The probability that Hannah eats two orange sweets is $\frac{1}{3}$

(a) Show that $n^2 - n - 90 = 0$

(3)

(b) Solve $n^2 - n - 90 = 0$ to find the value of n.

.....

(3)

(Total for Question 19 is 6 marks)

1 Uditi has a bag of chocolate sweets.

There are 30 sweets in the bag.

This table shows the types of sweets in the bag.

	Strawberry	Caramel	Nut
Dark chocolate	3	1	6
Milk chocolate	4	5	2
White chocolate	1	4	4

Uditi takes at random a sweet from the bag.

(a) Write down the probability that the sweet is a dark chocolate caramel.

.....

(1)

(b) Work out the probability that the sweet is a white chocolate.

.....

(2)

There are some dark chocolates, some milk chocolates and some white chocolates in a box.

The table below shows the probabilities that a chocolate taken at random from the box is a dark chocolate or is a milk chocolate.

	Dark chocolate	Milk chocolate	White chocolate
Probability	0.35	0.17	

A chocolate is taken at random from the box.

(c) Work out the probability that the chocolate is a white chocolate.

.....

(2)

(Total for Question 1 is 5 marks)

Question 67

1 Milly has a biased coin.

When she throws the coin once, the probability of getting heads is 0.2

(a) Write down the probability of getting tails.

.....

(1)

Milly throws the coin 200 times.

(b) Work out an estimate for the number of times she gets heads.

.....

(2)

(Total for Question 1 is 3 marks)

4 There are some black pens, some blue pens, some red pens and some green pens in a box.

The table shows the probabilities that a pen taken at random from the box will be black or will be blue or will be red.

colour	black	blue	red	green
probability	0.3	0.2	0.4	

There are 200 pens in the box.

(a) Work out the number of black pens in the box.

.....

(2)

A pen is taken at random from the box.

(b) Work out the probability that the pen will be green.

.....

(2)

(Total for Question 4 is 4 marks)

25 Nomusa has 30 sweets.

She has
18 fruit sweets
7 aniseed sweets
5 mint sweets

Nomusa is going to take at random two sweets.

Work out the probability that the two sweets will **not** be the same type of sweet.
You must show all your working.

.....

(Total for Question 25 is 4 marks)

1 An electronic game can show red or blue or green or yellow.

The table shows the probabilities that the colour shown will be red or will be green or will be yellow.

Colour	red	blue	green	yellow
Probability	0.15		0.41	0.24

Arthur plays the game.

(a) Work out the probability that the colour shown will be blue.

.....

(2)

Janice is going to play the game 50 times.

(b) Work out an estimate for the number of times the colour shown will be yellow.

.....

(2)

(Total for Question 1 is 4 marks)

***11** Laura is raising money for charity.

She has a game with two sets of cards.

Set A	1	3	5	6	7
Set B	2	4	8	9	

80 students are each going to play Laura's game once.

Each student takes at random one card from each set of cards.
They add the two numbers to get a total score.

Each student pays 70p to play the game.
Laura pays £3 to any student getting a total score of 9

Show that Laura can expect to make a profit of £20
You must show all your working.

(Total for Question 11 is 5 marks)

14 There are 11 counters in a bag.

4 of the counters are blue.
7 of the counters are green.

Maria takes at random a counter from the bag.
She keeps the counter.
She then takes at random another counter from the bag.

Work out the probability that Maria takes one counter of each colour.
You must show your working.

.....

(Total for Question 14 is 4 marks)

6 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.

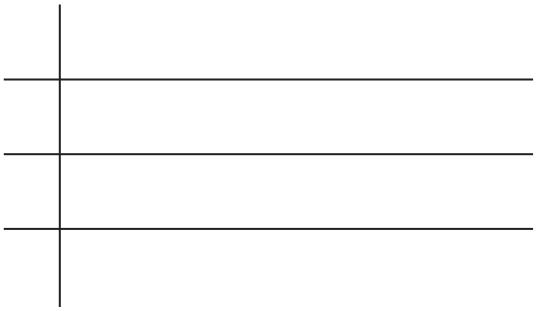
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(Total for Question 6 is 3 marks)

1 Chloe recorded the test marks of 20 students.

22	29	38	16	36	18	30	21	27	43
14	41	25	38	46	19	48	34	23	46

(a) Show this information in an ordered stem and leaf diagram.



(3)

One of these students is going to be chosen at random.

(b) Find the probability that this student has a test mark less than 28

.....

(2)

(Total for Question 1 is 5 marks)

5 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.

(Total for Question 5 is 3 marks)

Question 76

5 A factory produces light bulbs.

The probability of a light bulb being faulty is 0.03
One day the factory produces 1800 light bulbs.

Work out an estimate for the number of these light bulbs that are **not** faulty.

.....

(Total for Question 5 is 3 marks)

14 A weather forecast gives the probability of rain for each of three days.

Day	Probability of rain
Saturday	0.6
Sunday	0.3
Monday	0.2

The probability of rain on one day is independent of the probability of rain on a different day.

Work out the probability that it will rain on all 3 days.

.....

(Total for Question 14 is 2 marks)

16 There are six coins in a bag.
The value of each coin is shown below.

£2 £1 £1 50p 50p 50p

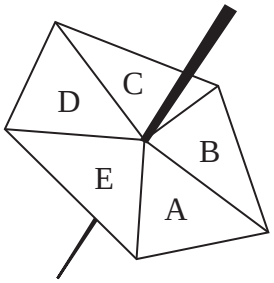
Laura takes at random a coin from the bag and keeps it.
Fahmida then takes at random a coin from the bag and keeps it.

Calculate the probability that Fahmida's coin has a greater value than Laura's coin.

.....

(Total for Question 16 is 3 marks)

4 Here is a five-sided spinner.



The table shows the probabilities that the spinner will land on A or on B or on C or on D.

Letter	A	B	C	D	E
Probability	0.25	0.10	0.20	0.15	

Kirsty spins the spinner once.

(a) Work out the probability that the spinner will land on E.

.....

(2)

Chris is going to spin the spinner 60 times.

(b) Work out an estimate for the number of times the spinner will land either on A or on B.

.....

(3)

(Total for Question 4 is 5 marks)

11 A factory makes 5000 televisions.

Greta is going to take a random sample of 25 of these televisions.

Describe a method she could use to select the sample.

.....

.....

.....

(Total for Question 11 is 1 mark)

16 The probability that a car will pass a test is 0.95

Three cars are going to be tested.

(a) Work out the probability that none of these cars will pass the test.

.....

(2)

(b) Work out the probability that exactly two of these cars will pass the test.
You must show your working.

.....

(3)

(Total for Question 16 is 5 marks)

Question 82

9 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.

.....

(Total for Question 9 is 3 marks)

Question 83

1 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

.....

(Total for Question 1 is 3 marks)

3 The table shows some information about the dress sizes of 25 women.

Dress size	Number of women
8	2
10	9
12	8
14	6

(a) Find the median dress size.

.....

(1)

3 of the 25 women have a shoe size of 7

Zoe says that if you choose at random one of the 25 women, the probability that she has either a shoe size of 7 or a dress size of 14 is $\frac{9}{25}$ because

$$\frac{3}{25} + \frac{6}{25} = \frac{9}{25}$$

(b) Is Zoe correct?
You must give a reason for your answer.

.....

.....

(1)

(Total for Question 3 is 2 marks)

13 A factory makes 450 pies every day.
The pies are chicken pies or steak pies.

Each day Milo takes a sample of 15 pies to check.

The proportion of the pies in his sample that are chicken is the same as the proportion of the pies made that day that are chicken.

On Monday Milo calculated that he needed exactly 4 chicken pies in his sample.

(a) Work out the total number of chicken pies that were made on Monday.

.....

(2)

On Tuesday, the number of steak pies Milo needs in his sample is 6 correct to the nearest whole number.

Milo takes at random a pie from the 450 pies made on Tuesday.

(b) Work out the lower bound of the probability that the pie is a steak pie.

.....

(2)

(Total for Question 13 is 4 marks)

Question 86

4 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.

.....

(Total for Question 4 is 3 marks)

21 There are 12 counters in a bag.
There is an equal number of red counters, blue counters and yellow counters in the bag.
There are no other counters in the bag.

3 counters are taken at random from the bag.

(a) Work out the probability of taking 3 red counters.

.....

(2)

The 3 counters are put back into the bag.

Some more counters are now put into the bag.
There is still an equal number of red counters, blue counters and yellow counters in the bag.
There are no counters of any other colour in the bag.

3 counters are taken at random from the bag.

(b) Is it now less likely or equally likely or more likely that the 3 counters will be red?
You must show how you get your answer.

(2)

(Total for Question 21 is 4 marks)

8 When a drawing pin is dropped it can land point down or point up.

Lucy, Mel and Tom each dropped the drawing pin a number of times.

The table shows the number of times the drawing pin landed point down and the number of times the drawing pin landed point up for each person.

	Lucy	**Mel**	**Tom**
point down	31	53	16
point up	14	27	9

Rachael is going to drop the drawing pin once.

(a) Whose results will give the best estimate for the probability that the drawing pin will land point up?
Give a reason for your answer.

.....

.....

(1)

Stuart is going to drop the drawing pin twice.

(b) Use all the results in the table to work out an estimate for the probability that the drawing pin will land point up the first time and point down the second time.

.....

(2)

(Total for Question 8 is 3 marks)

10 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	

(a) Work out the probability of getting a red counter.

.....

(1)

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

.....

.....

(2)

(Total for Question 10 is 3 marks)

Question 90

16 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.

.....

(Total for Question 16 is 3 marks)

Question 91

8 60 people were asked if they prefer to go on holiday in Britain or in Spain or in Italy.

38 of the people were male.
11 of the 32 people who said Britain were female.
8 males said Italy.
12 people said Spain.

One of the females is chosen at random.

What is the probability that this female said Spain?

.....

(Total for Question 8 is 4 marks)

6 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.

(a) Work out the number of red counters in the bag.

.....

(4)

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.

(b) Explain why.

.....

.....

(1)

(Total for Question 6 is 5 marks)

20 50 people were asked if they speak French or German or Spanish.

Of these people,

31 speak French
2 speak French, German and Spanish
4 speak French and Spanish but not German
7 speak German and Spanish
8 do not speak any of the languages
all 10 people who speak German speak at least one other language

Two of the 50 people are chosen at random.

Work out the probability that they both only speak Spanish.

.....

(Total for Question 20 is 5 marks)

22 There are only green pens and blue pens in a box.

There are three more blue pens than green pens in the box.
There are more than 12 pens in the box.

Simon is going to take at random two pens from the box.

The probability that Simon will take two pens of the same colour is $\frac{27}{55}$

Work out the number of green pens in the box.

.....

(Total for Question 22 is 6 marks)

16 There are only red counters and blue counters in a bag.

Joe takes at random a counter from the bag.
The probability that the counter is red is 0.65
Joe puts the counter back into the bag.

Mary takes at random a counter from the bag.
She puts the counter back into the bag.

(a) What is the probability that Joe and Mary take counters of different colours?

.....

(2)

There are 78 red counters in the bag.

(b) How many blue counters are there in the bag?

.....

(2)

(Total for Question 16 is 4 marks)

Question 96

1 There are only blue cubes, red cubes and yellow cubes in a box.

The table shows the probability of taking at random a blue cube from the box.

Colour	blue	red	yellow
Probability	0.2		

The number of red cubes in the box is the same as the number of yellow cubes in the box.

(a) Complete the table.

(2)

There are 12 blue cubes in the box.

(b) Work out the total number of cubes in the box.

.....

(2)

(Total for Question 1 is 4 marks)

Question 97

22 There are only r red counters and g green counters in a bag.

A counter is taken at random from the bag.

The probability that the counter is green is $\frac{3}{7}$

The counter is put back in the bag.

2 more red counters and 3 more green counters are put in the bag.
A counter is taken at random from the bag.

The probability that the counter is green is $\frac{6}{13}$

Find the number of red counters and the number of green counters that were in the bag originally.

red counters.....

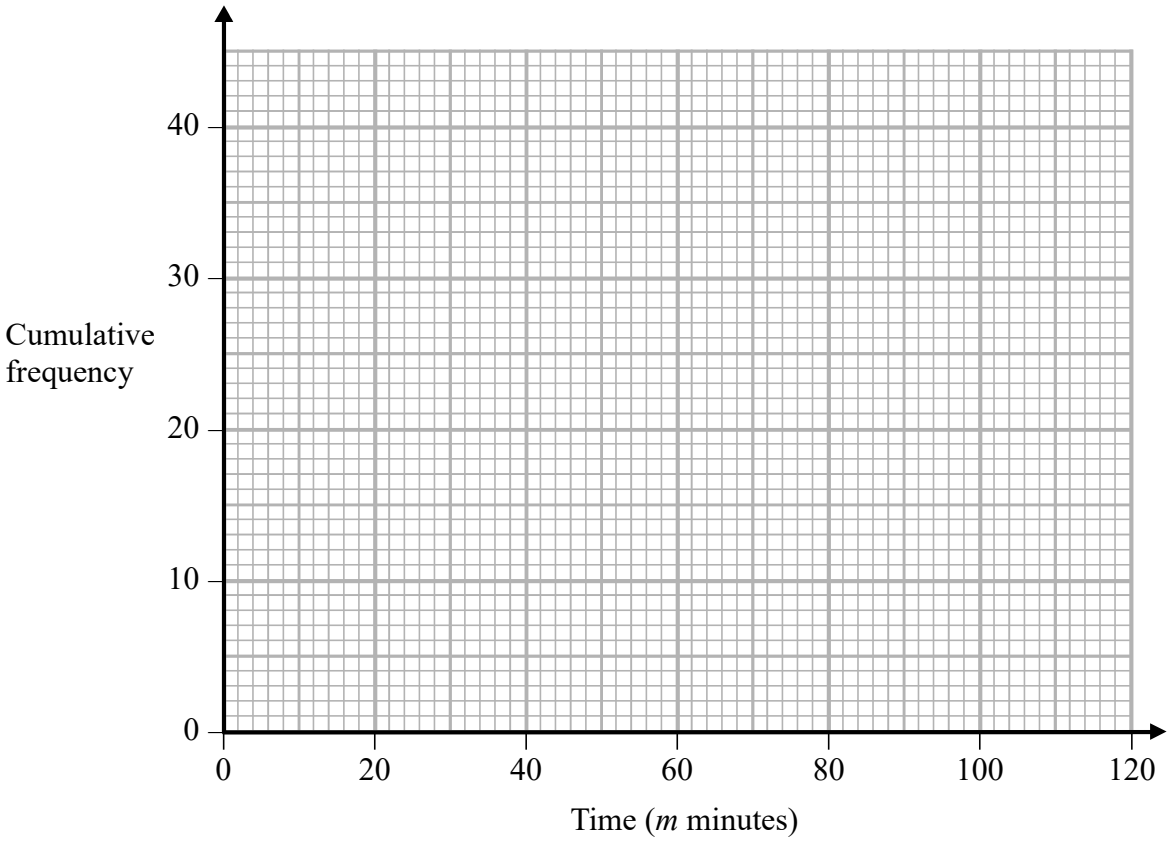
green counters.....

(Total for Question 22 is 5 marks)

10 The cumulative frequency table shows information about the times, in minutes, taken by 40 people to complete a puzzle.

Time (m minutes)	Cumulative frequency
$20 < m \leqslant 40$	5
$20 < m \leqslant 60$	25
$20 < m \leqslant 80$	35
$20 < m \leqslant 100$	38
$20 < m \leqslant 120$	40

(a) On the grid below, draw a cumulative frequency graph for this information.



(2)

(b) Use your graph to find an estimate for the interquartile range.

..... minutes
(2)

One of the 40 people is chosen at random.

(c) Use your graph to find an estimate for the probability that this person took between 50 minutes and 90 minutes to complete the puzzle.

.....
(2)

(Total for Question 10 is 6 marks)

Question 99

11 There are p counters in a bag.
12 of the counters are yellow.

Shafiq takes at random 30 counters from the bag.
5 of these 30 counters are yellow.

Work out an estimate for the value of p.

.....

(Total for Question 11 is 2 marks)

Question 100

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21 When a biased coin is thrown 4 times, the probability of getting 4 heads is $\frac{16}{81}$

Work out the probability of getting 4 tails when the coin is thrown 4 times.

.....

(Total for Question 21 is 2 marks)

14 Sally plays two games against Martin.
In each game, Sally could win, draw or lose.

In each game they play,
the probability that Sally will win against Martin is 0.3
the probability that Sally will draw against Martin is 0.1

Work out the probability that Sally will win **exactly** one of the two games against Martin.

.....

(Total for Question 14 is 3 marks)

20 There are only red sweets and yellow sweets in a bag.

There are n red sweets in the bag.
There are 8 yellow sweets in the bag.

Sajid is going to take at random a sweet from the bag and eat it.

He says that the probability that the sweet will be red is $\frac{7}{10}$

(a) Show why the probability cannot be $\frac{7}{10}$

(3)

After Sajid has taken the first sweet from the bag and eaten it, he is going to take at random a second sweet from the bag.

Given that the probability that both the sweets he takes will be red is $\frac{3}{5}$

(b) work out the number of red sweets in the bag.
You must show all your working.

.....

(5)

(Total for Question 20 is 8 marks)

8 There are some counters in a bag.
The counters are blue or green or red or yellow.

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

Colour	blue	green	red	yellow
Probability	0.32	0.20		

The probability that a counter taken at random from the bag will be red is five times the probability that the counter will be yellow.

There are 300 counters in the bag.

Work out the number of yellow counters in the bag.

.....

(Total for Question 8 is 3 marks)

16 There are only 3 red counters and 5 yellow counters in a bag.

Jude takes at random 3 counters from the bag.

Work out the probability that he takes exactly one red counter.

.....

(Total for Question 16 is 4 marks)

20 In a village,

if it rains on one day, the probability that it will rain on the next day is 0.8
if it does **not** rain on one day, the probability that it will rain on the next day is 0.6

A weather forecaster says,

"There is a 70% chance that it will rain in the village on Monday."

Work out an estimate for the probability that it will rain in the village on Wednesday.
You must show all your working.

.....

(Total for Question 20 is 4 marks)

6 In a bag there are only red counters, blue counters, green counters and pink counters.
A counter is going to be taken at random from the bag.

The table shows the probabilities of taking a red counter or a blue counter.

Colour	red	blue	green	pink
Probability	0.05	0.15	.....	.....

The probability of taking a green counter is 0.2 more than the probability of taking a pink counter.

(a) Complete the table.

(2)

There are 18 blue counters in the bag.

(b) Work out the total number of counters in the bag.

.....

(2)

(Total for Question 6 is 4 marks)

20 Pat throws a fair coin n times.

Find an expression, in terms of n, for the probability that Pat gets at least 1 head and at least 1 tail.

.....

(Total for Question 20 is 2 marks)

11 Cormac has some sweets in a bag.
The sweets are lime flavoured or strawberry flavoured or orange flavoured.

In the bag

$$\begin{matrix}\text{number of lime}\\ \text{flavoured sweets}\end{matrix} : \begin{matrix}\text{number of strawberry}\\ \text{flavoured sweets}\end{matrix} : \begin{matrix}\text{number of orange}\\ \text{flavoured sweets}\end{matrix} = 9 : 4 : x$$

Cormac is going to take at random a sweet from the bag.

The probability that he takes a lime flavoured sweet is $\frac{3}{7}$

Work out the value of x.

$x =$ .....

(Total for Question 11 is 3 marks)

16 A first aid test has two parts, a theory test and a practical test.
The probability of passing the theory test is 0.75
The probability of passing only one of the two parts is 0.36

The two events are independent.

Work out the probability of passing the practical test.

.....

(Total for Question 16 is 4 marks)

21 Ray has nine cards numbered 1 to 9



Ray takes at random three of these cards.

He works out the sum of the numbers on the three cards and records the result.

Work out the probability that the result is an even number.

.....

(Total for Question 21 is 4 marks)

5 A car factory is going to make four different car models **A**, **B**, **C** and **D**.

80 people are asked which of the four models they would be most likely to buy.

The table shows information about the results.

Car model	Number of people
A	23
B	15
C	30
D	12

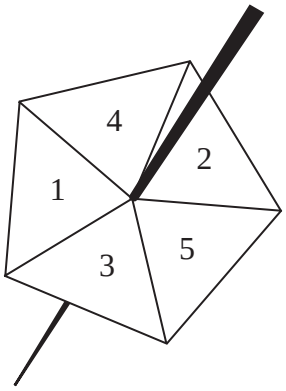
The factory is going to make 40 000 cars next year.

Work out how many model **B** cars the factory should make next year.

.....

(Total for Question 5 is 2 marks)

10 Lina spins a biased 5-sided spinner 40 times.



Here are her results.

Score	1	2	3	4	5
Frequency	6	8	9	7	10

Lina is now going to spin the spinner another two times.

(a) Work out an estimate for the probability that she gets a score of 5 both times.

.....

(2)

Derek is going to spin the spinner a large number of times.

(b) Work out an estimate for the percentage of times Derek can expect to get a score of 1

.....%

(2)

(Total for Question 10 is 4 marks)

20 Alfie has 11 cards.

He has

3 blue cards
7 green cards
and 1 white card.

Alfie takes at random 2 of these cards.

Work out the probability that he takes cards of different colours.

.....

(Total for Question 20 is 3 marks)

15 Faiza is studying the population of rabbits in a park.
She wants to estimate the number of rabbits in the park.

On Monday she catches a random sample of 20 rabbits in the park, marks each rabbit with a tag and releases them back into the park.

On Tuesday she catches a random sample of 42 rabbits in the park.
12 of the rabbits are marked with a tag.

(a) Find an estimate for the number of rabbits in the park.

.....

(3)

Albie is studying the population of rabbits in a wood.

One day, he catches 55 rabbits and finds that 40 of these rabbits are marked with a tag.

Albie estimates there are 50 rabbits in the wood.

(b) Explain why Albie's estimate cannot be correct.

.....

.....

.....

(1)

(Total for Question 15 is 4 marks)

19 There are only blue counters, red counters and green counters in a box.

The probability that a counter taken at random from the box will be blue is 0.4
The ratio of the number of red counters to the number of green counters is 7 : 8

Sameena takes at random a counter from the box.
She records its colour and puts the counter back in the box.
Sameena does this a total of 50 times.

Work out an estimate for the number of times she takes a green counter.

.....

(Total for Question 19 is 3 marks)

10 A biased dice is thrown 60 times.

The table shows information about the number that the dice lands on each time.

Number on dice	1	2	3	4	5	6
Frequency	12	7	8	9	9	15

Gethin throws the dice twice.

(a) Work out an estimate for the probability that the dice will land on 6 both times.

.....

(3)

Sally is going to throw the same dice *n* times and record the number it lands on each time.

She will use her results to work out a more reliable estimate for the probability in part (a).

(b) What can you say about the value of *n*?

.....

.....

.....

(1)

(Total for Question 10 is 4 marks)

22 There are only blue pens and red pens in a box.

The number of blue pens is four times the number of red pens.

Rita takes at random one pen from the box.
She records the colour of the pen and then replaces it in the box.
Rita does this n times, where $n \geqslant 2$

Write down an expression, in terms of n, for the probability that Rita gets a blue pen at least once and a red pen at least once.

.....

(Total for Question 22 is 2 marks)

18 Spinner **A** and spinner **B** are each spun once.

The probability that spinner **A** lands on red is $\frac{1}{4}$

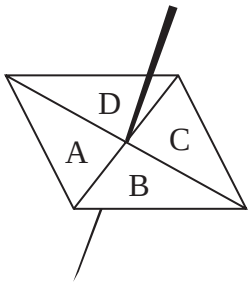
The probability that both spinner **A** and spinner **B** land on red is $\frac{1}{24}$

Work out the probability that one spinner lands on red and the other spinner does **not** land on red.

.....

(Total for Question 18 is 4 marks)

2 Here is a biased spinner.



The table shows the probabilities that when the spinner is spun it will land on A, on B, on C and on D.

Letter	A	B	C	D
Probability	0.4	0.21	0.32	0.07

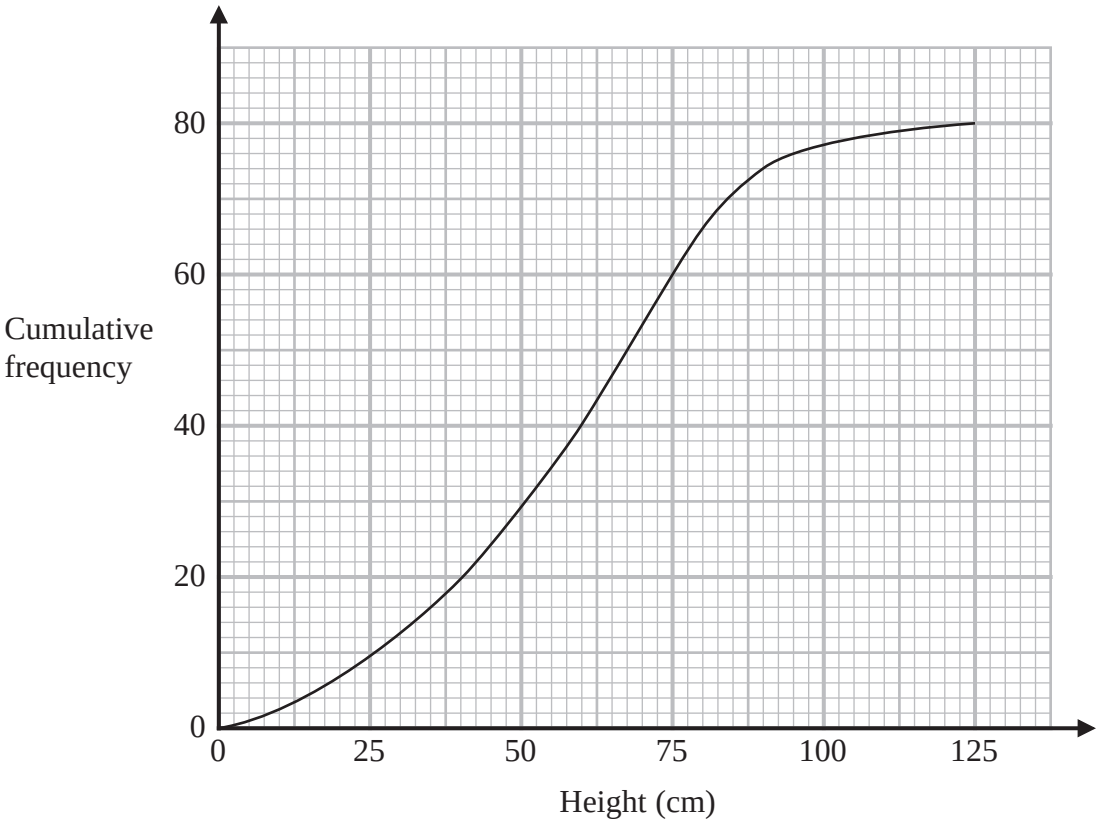
Luka will spin the spinner 200 times.

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

.....

(Total for Question 2 is 2 marks)

13 Alan grew 80 plants of the same type outside.
The cumulative frequency graph shows information about the heights, in cm, of these plants.



One of the plants is chosen at random.

(a) Find an estimate for the probability that this plant will have a height greater than 90 cm.

.....

(2)

(b) Use the graph to find an estimate for the median height.

..... cm

(1)

(c) Use the graph to find an estimate for the interquartile range of the heights.

..... cm

(2)

Alan also grew plants of the same type inside.

The interquartile range of the heights of these plants is 30 cm.

(d) Give one comparison between the distribution of the heights of the plants grown inside with the distribution of the heights of the plants grown outside.

.....

.....

.....

.....

(1)

(Total for Question 13 is 6 marks)

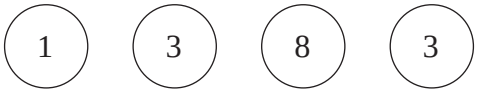
16 Zia has to set a 4-digit security passcode on her phone.

Each digit of the passcode is a number from 1 to 9
She can use each number more than once.

Zia tells her friend Amber that

the first digit is a cube number
the second digit is a prime number
the third digit is greater than 6
the fourth digit is an odd number.

The diagram shows one possible 4-digit passcode.



Amber is going to have one attempt at guessing Zia's passcode.

Work out the probability that Amber guesses Zia's passcode on the first attempt.

.....

(Total for Question 16 is 3 marks)

16 There are only n orange sweets and 1 white sweet in a bag.

Saira takes at random a sweet from the bag and eats the sweet.
She then takes at random another sweet from the bag and eats this sweet.

Show that the probability that Saira eats two orange sweets is $\frac{n-1}{n+1}$

(Total for Question 16 is 2 marks)

4 There are only red discs, blue discs and yellow discs in a bag.
There are 24 yellow discs in the bag.

Mel is going to take at random a disc from the bag.

The probability that the disc will be yellow is 0.16

the number of red discs : the number of blue discs = 5 : 4

Work out the number of red discs in the bag.

.....

(Total for Question 4 is 4 marks)

18 There are only 4 red counters, 3 yellow counters and 1 green counter in a bag.

Tony takes at random three counters from the bag.

Work out the probability that there are now more yellow counters than red counters in the bag.
You must show all your working.

.....

(Total for Question 18 is 5 marks)

13 There are 30 students in a class.
A teacher is going to choose at random 2 of the students.

Work out the number of different pairs of students that the teacher can choose.

.....

(Total for Question 13 is 2 marks)

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

Number on dice	1	2	3	4	5	6
Probability			0.10	0.30	0.05	0.25

Karim assumes that the probabilities that the dice will land on 1 and on 2 are the same.

Karim rolls the biased dice 500 times.

(a) Assuming Karim is right, work out an estimate for the number of times the dice will land on 2

.....

(3)

Karim is wrong.
The probability that the dice will land on 2 is greater than the probability that the dice will land on 1

(b) How does this information affect your answer to part (a)?

.....

.....

.....

(1)

(Total for Question 2 is 4 marks)

19 In the semi-finals of a chess tournament,
player **A** will play player **B**
and player **C** will play player **D**.

The two winners will then play each other in the final.

The probability that player **A** will win against player **B** is 0.6
The probability that player **A** will win against player **C** is 0.5
The probability that player **A** will win against player **D** is 0.3
The probability that player **C** will win against player **D** is 0.2

Work out the probability that player **A** will win the chess tournament.

.....

(Total for Question 19 is 4 marks)

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

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

The table shows the probability that he will take a red counter and the probability that he will take a white counter.

Colour	red	white	blue	green
Probability	0.3	0.1		

There are twice as many blue counters as there are green counters in the bag.

(a) Work out the probability that Chris will take a blue counter.

.....

(3)

There are 45 red counters in the bag.

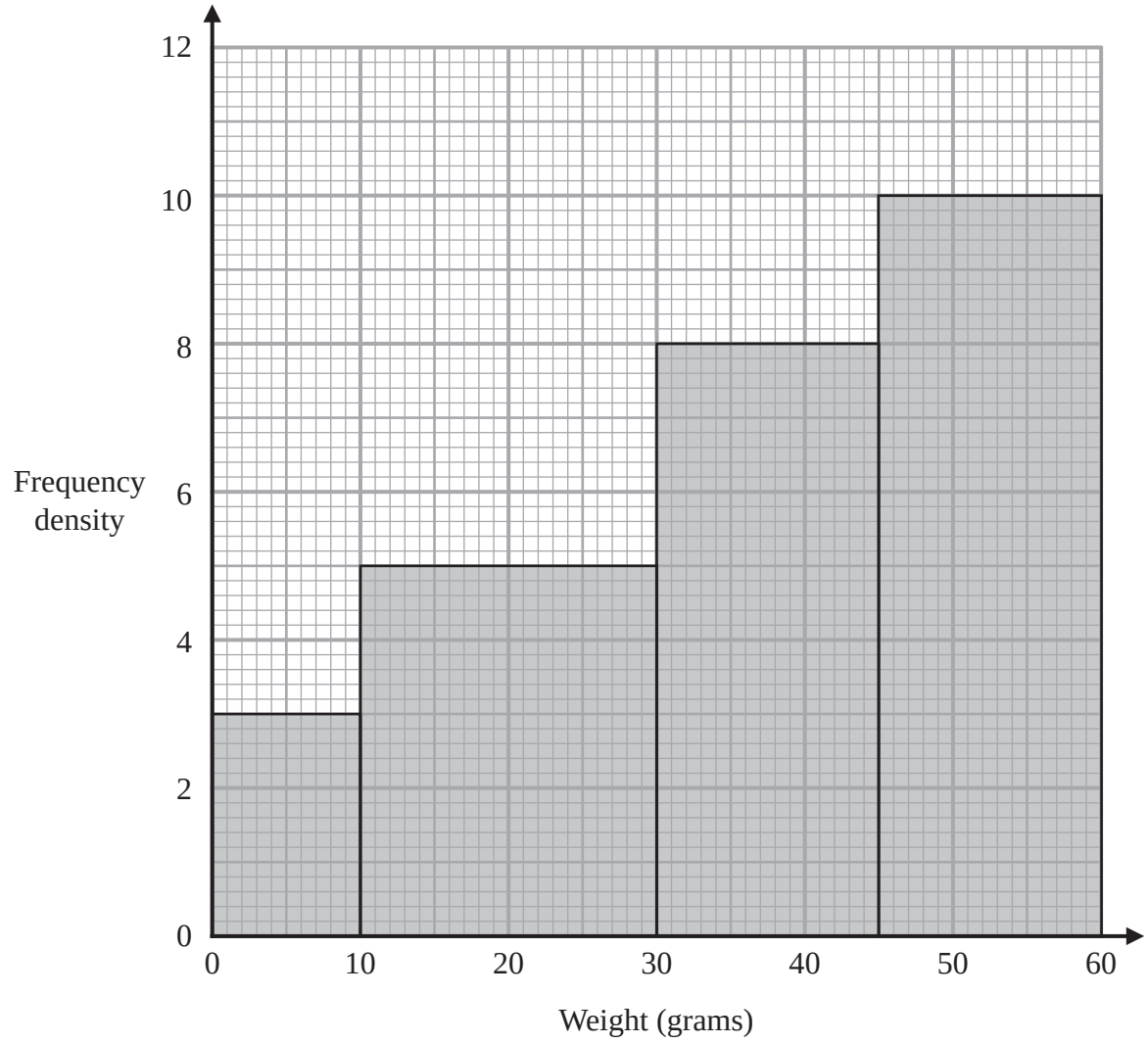
(b) Work out the total number of counters in the bag.

.....

(2)

(Total for Question 2 is 5 marks)

15 The histogram gives information about the weights, in grams, of some biscuits.



One of these biscuits is taken at random.

Work out an estimate for the probability that the biscuit will have a weight between 20 grams and 40 grams.

.....

(Total for Question 15 is 4 marks)

15 There are only 7 blue pens and 3 red pens in a box.

Raja takes at random one of the pens.
He notes the colour of the pen and puts the pen back into the box.

Raja does this two more times.

Show that the probability that Raja takes at least two blue pens is $\frac{98}{125}$

(Total for Question 15 is 4 marks)