

Mock topics 21-29 test

Name:

Q1.

The table shows information about the times taken by 100 people in a fun run.

Time (t minutes)	Frequency
$20 < t \leq 30$	4
$30 < t \leq 40$	16
$40 < t \leq 50$	36
$50 < t \leq 60$	24
$60 < t \leq 70$	14
$70 < t \leq 80$	6

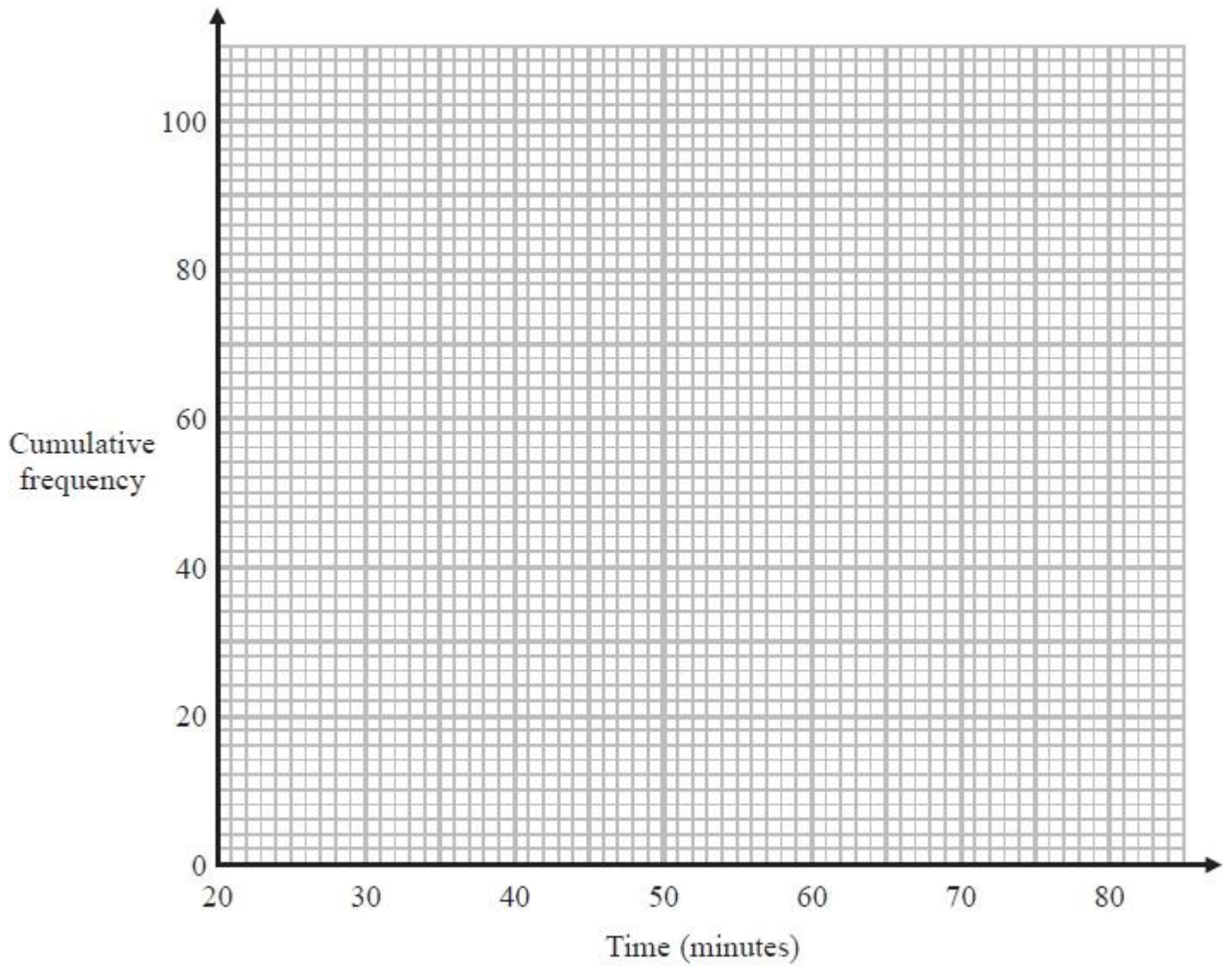
(a) Complete the cumulative frequency table for this information.

Time (t minutes)	Cumulative frequency
$20 < t \leq 30$	
$20 < t \leq 40$	
$20 < t \leq 50$	
$20 < t \leq 60$	
$20 < t \leq 70$	
$20 < t \leq 80$	

(b) On the grid, draw a cumulative frequency graph for your table.

(1)

(2)



(c) Use your graph to find an estimate for the median time.

..... minutes
(1)

(d) Use your graph to find an estimate for the number of people who took longer than 63 minutes.

.....
(2)

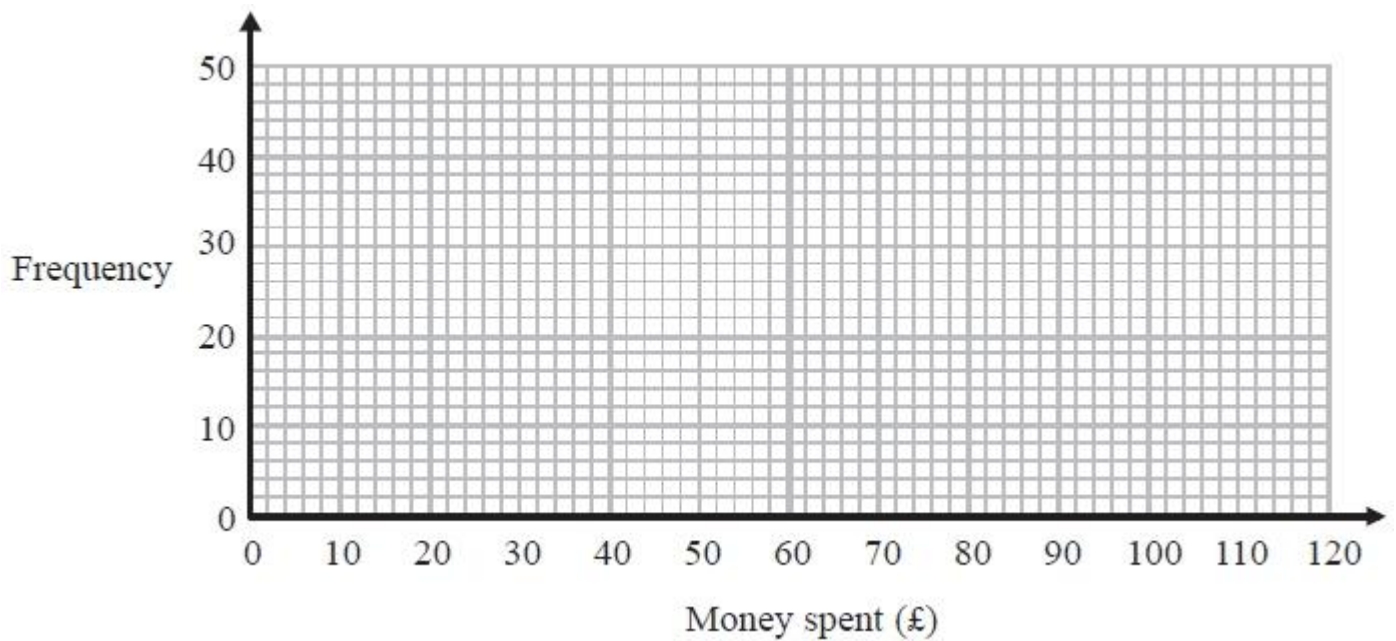
(Total for question = 6 marks)

Q2.

The table gives information about the money, £ A , some people spent on an internet site one day.

Money spent (£ A)	Frequency
$0 < A \leq 20$	10
$20 < A \leq 40$	15
$40 < A \leq 60$	25
$60 < A \leq 80$	40
$80 < A \leq 100$	6

(a) On the grid, draw a frequency polygon for this information.



(2)

(b) Write down the modal class interval.

.....

(1)

(Total for question = 3 marks)

Q3.

Bob asked each of 40 friends how many minutes they took to get to work.

The table shows some information about his results.

Time taken (m minutes)	Frequency
$0 < m \leq 10$	3
$10 < m \leq 20$	8
$20 < m \leq 30$	11
$30 < m \leq 40$	9
$40 < m \leq 50$	9

Work out an estimate for the mean time taken.

..... minutes

(Total for Question is 4 marks)

Q4.

The table shows some information about the prices of 64 secondhand cars that are for sale.

Price (£x)	Frequency		
$0 < x \leq 2000$	8		
$2000 < x \leq 4000$	14		
$4000 < x \leq 6000$	28		
$6000 < x \leq 8000$	10		
$8000 < x \leq 10000$	4		

(a) Calculate an estimate for the mean price.

£

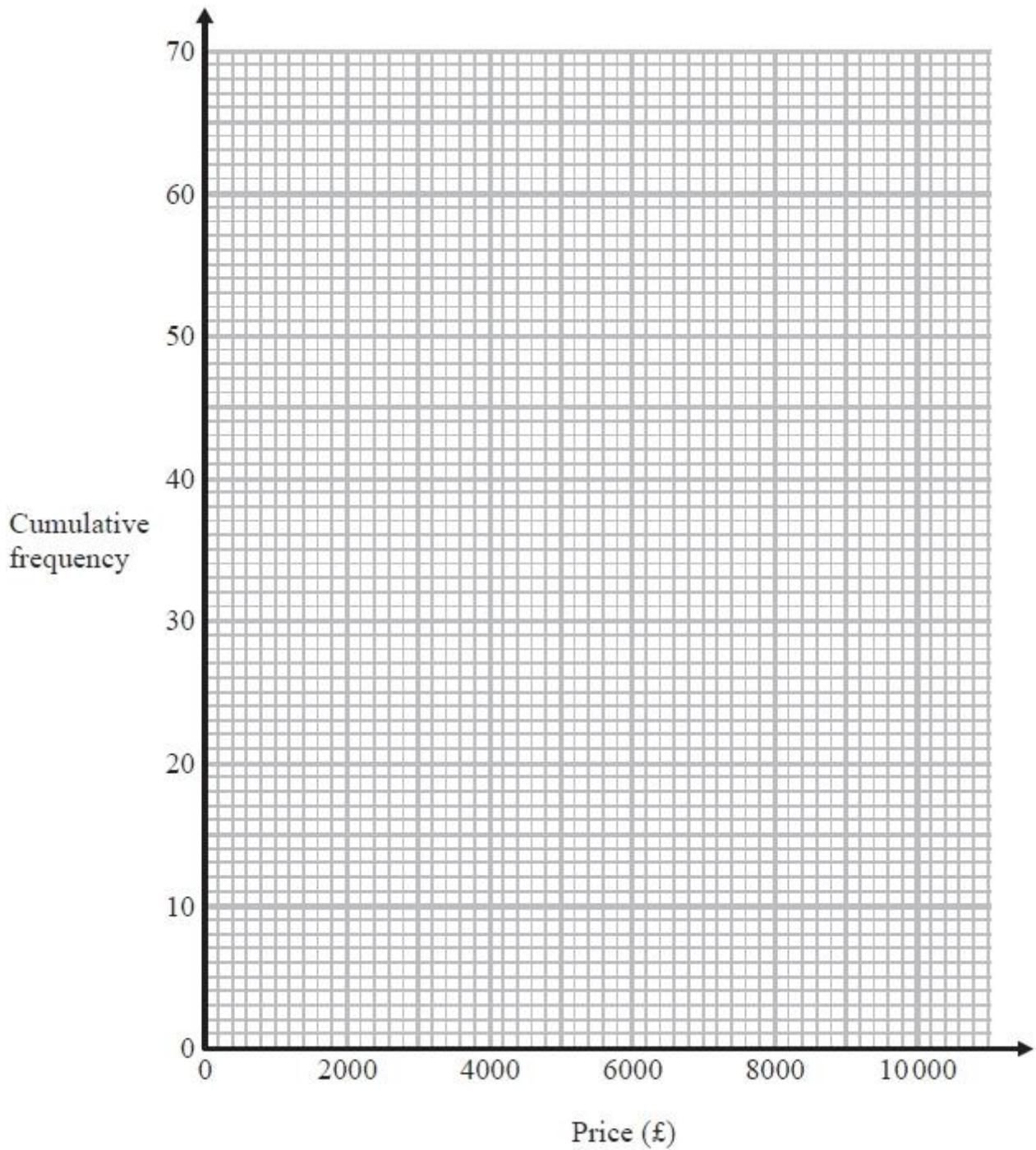
(4)

(b) Complete the cumulative frequency table.

Price (£x)	Cumulative frequency
$0 < x \leq 2000$	
$0 < x \leq 4000$	
$0 < x \leq 6000$	
$0 < x \leq 8000$	
$0 < x \leq 10000$	

(1)

(c) On the grid, draw a cumulative frequency graph for your table.



(2)

(d) Find an estimate for the interquartile range.

£

(2)

(Total for question = 9 marks)

Q5.

The table gives information about the numbers of badges gained by the younger girls in a Guide group.

Number of badges	Frequency
0	2
1	8
2	4
3	3
4	5
5	3

(a) Write down the mode.

.....
(1)

(b) Work out the mean number of badges gained by these girls.

.....
(3)

There are 15 older girls in the Guide group.
The mean number of badges gained by these 15 older girls is 4.4

(c) Work out the mean number of badges gained by all the girls in the Guide group.

.....
(3)

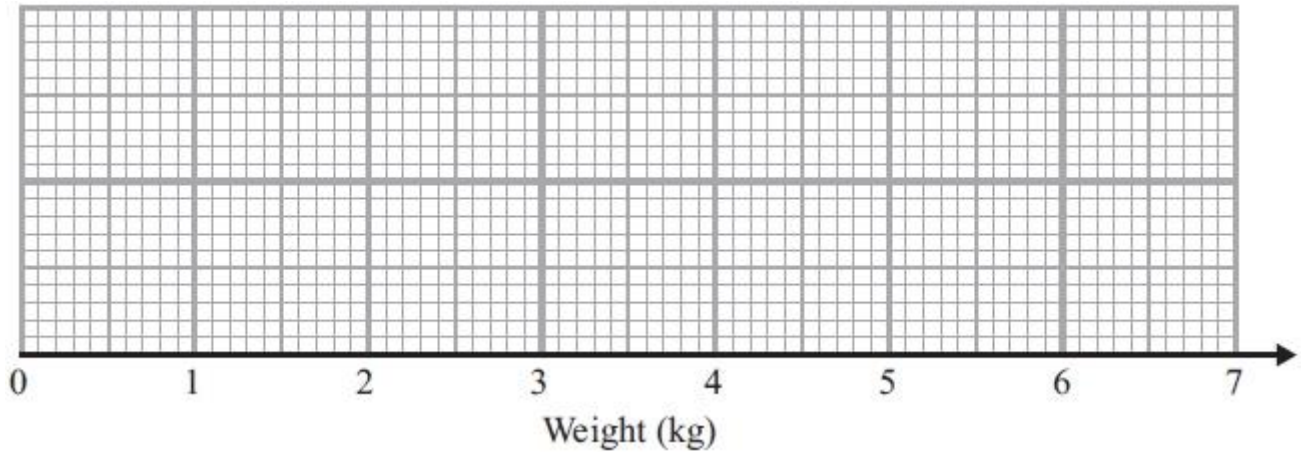
(Total for question = 7 marks)

Q6.

The table gives some information about the weights of 60 babies.

Lowest	2.0 kg
Highest	6.5 kg
Lower quartile	2.8 kg
Upper quartile	4.2 kg
Median	3.0 kg

(a) Draw a box plot to show this information.



(2)

There are 60 babies.

(b) Work out an estimate for the number of these babies with a weight greater than 2.8 kg.

.....
(2)

(Total for Question is 4 marks)

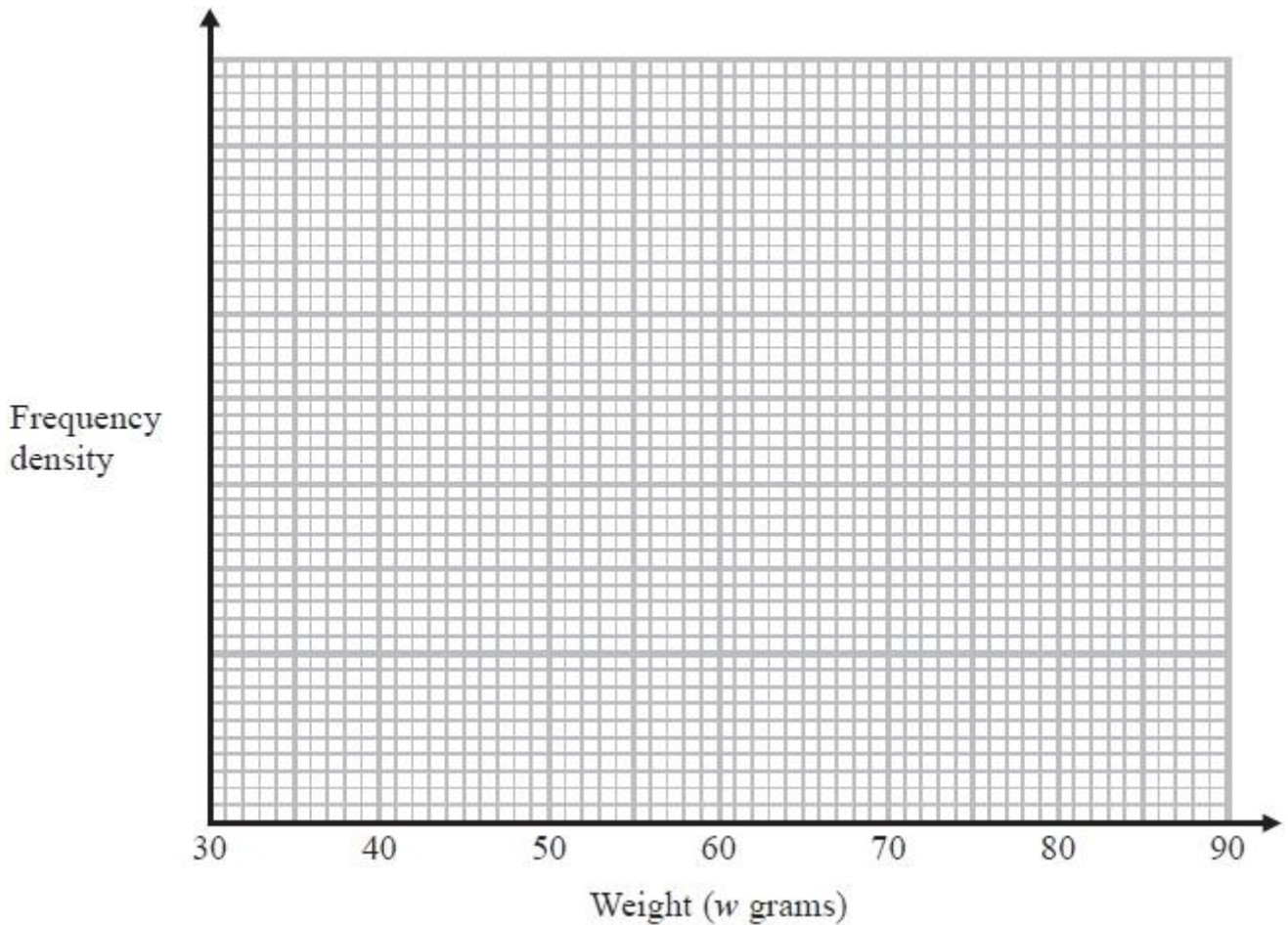
Q7.

Billy keeps chickens.

The table shows information about the weights, in grams, of eggs produced by the chickens.

Weight (w grams)	$30 < w \leq 50$	$50 < w \leq 60$	$60 < w \leq 70$	$70 < w \leq 85$
Number of eggs	12	20	17	6

(a) On the grid, draw a histogram for this information.



(3)

Medium eggs weigh between 53grams and 63grams.

(b) Work out an estimate for the number of medium eggs produced.

.....
(3)
(Total for question = 6 marks)

Q8.

(a) Explain what is meant by a stratified sample.

.....
.....

(1)

The table shows information about the ages of the people living in a village.

Age group	Number of people
Under 21	72
21–40	90
41–60	123
Over 60	314

Mrs Parrish carries out a survey of these people.
She uses a sample size of 50 people stratified by age group.

(b) Work out the number of people over 60 years of age in the sample.

.....
(2)

(Total for Question is 3 marks)

Q9.

A set of tyres normally costs £500
In a sale there is a 30% discount.

Work out the sale price of the set of tyres.

£.....

(Total for Question is 3 marks)

Q10.

30% of the people at a concert are female.
1295 of the people at the concert are male.

Work out the number of people at the concert who are female.

.....
(Total for question = 3 marks)

Q11.

Claire is making a loaf of bread.
A loaf of bread loses 12% of its weight when it is baked.

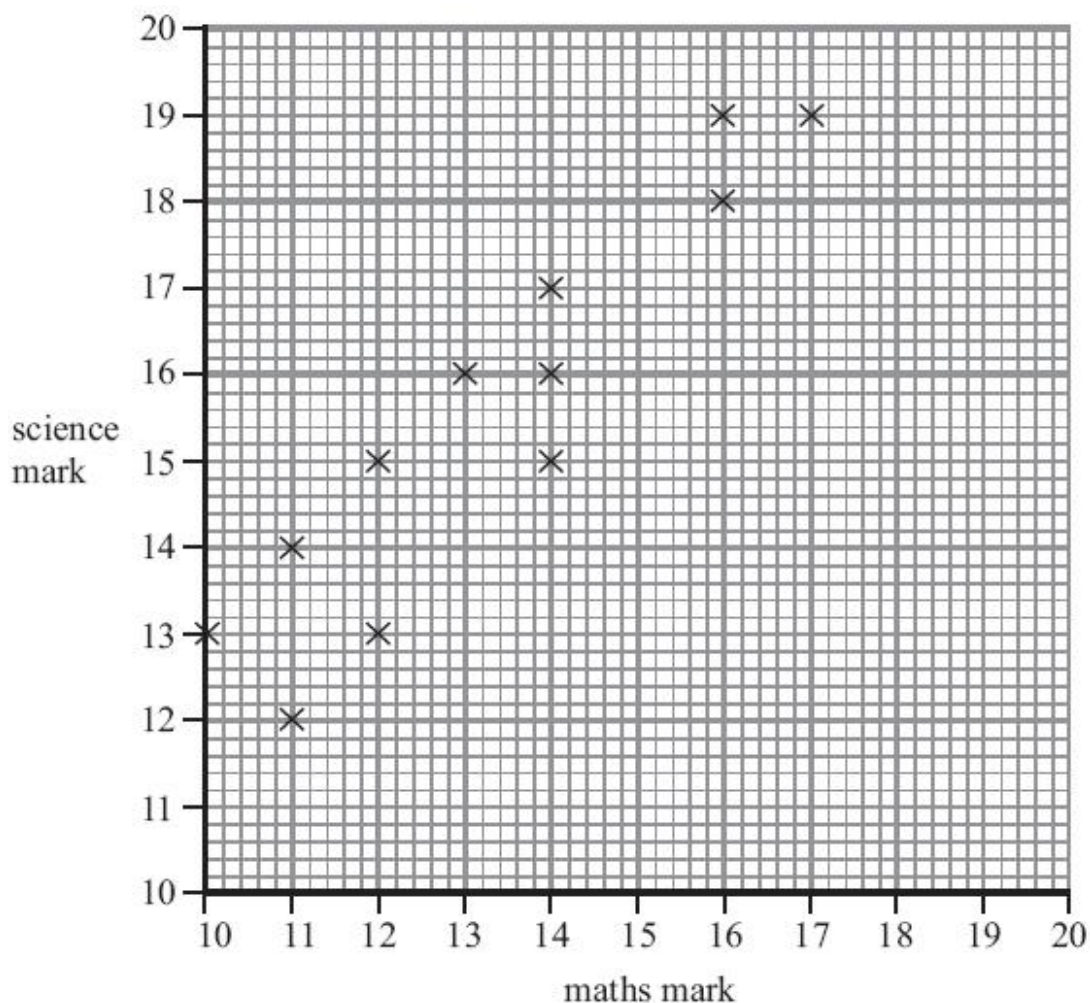
Claire wants the baked loaf of bread to weigh 1.1 kg.

Work out the weight of the loaf of bread before it is baked.

..... kg
(Total for question = 3 marks)

Q12.

Mr Kent's students did a maths test and a science test.
The scatter graph shows the marks of 12 of these students.



The table shows the marks of two more students.

Name	maths	science
Masood	12	14
Nimer	17	20

(a) Show this information on the scatter graph.

(1)

(b) What type of correlation does this scatter graph show?

(1)

David did the maths test.
He was absent for the science test.

David's mark in the maths test was 15

(c) Estimate a science mark for David.

(2)

(Total for Question is 4 marks)

Q13.

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)

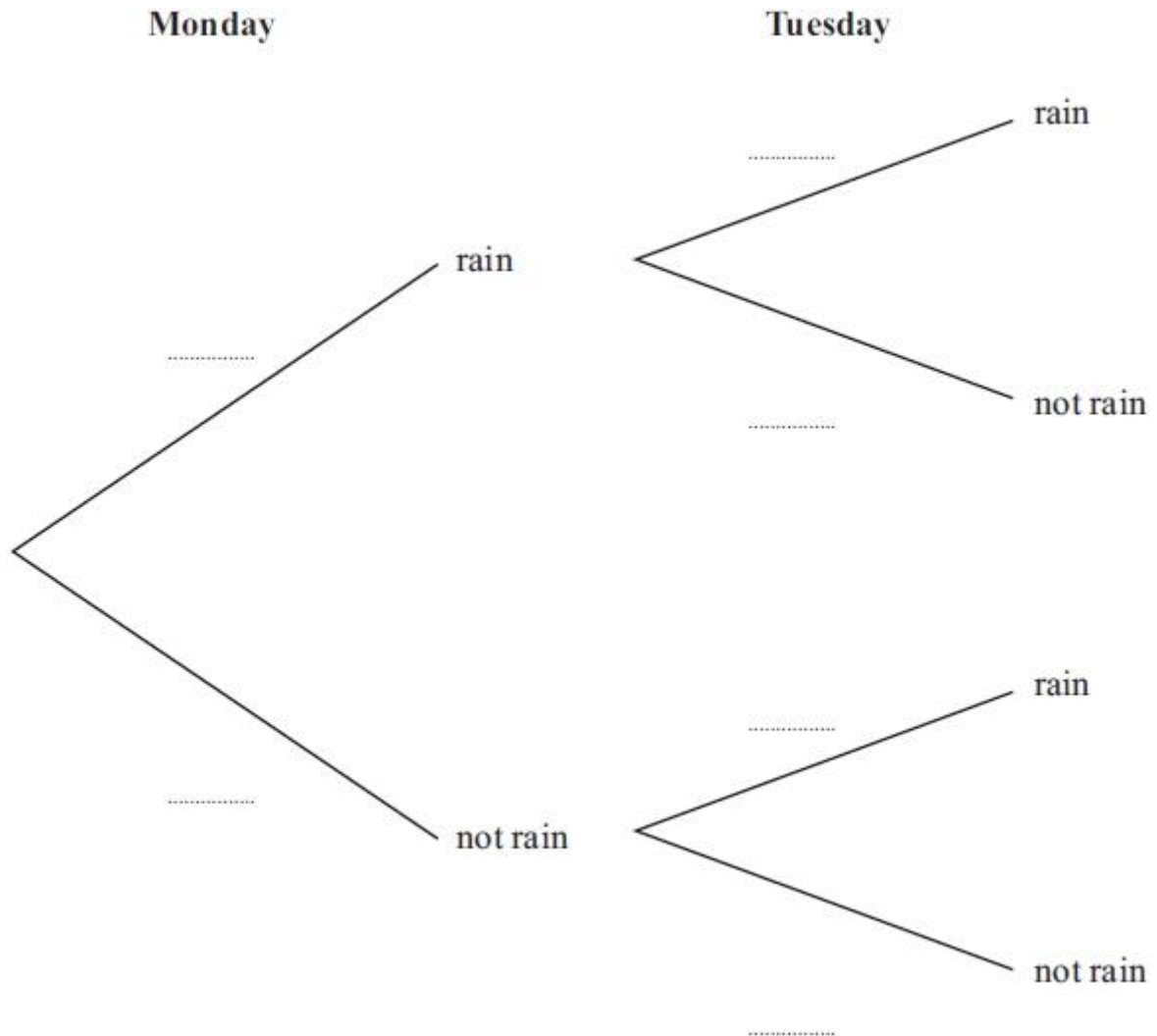
(Total for Question is 6 marks)

Q15.

The probability that it will rain on Monday is 0.6

When it rains on Monday, the probability that it will rain on Tuesday is 0.8

When it does **not** rain on Monday, the probability that it will rain on Tuesday is 0.5



(a) Complete the probability tree diagram.

(2)

(b) Work out the probability that it will rain on both Monday and Tuesday.

.....
(2)

(c) Work out the probability that it will rain on at least one of the two days.

.....
(3)

(Total for Question is 7 marks)

Q16.

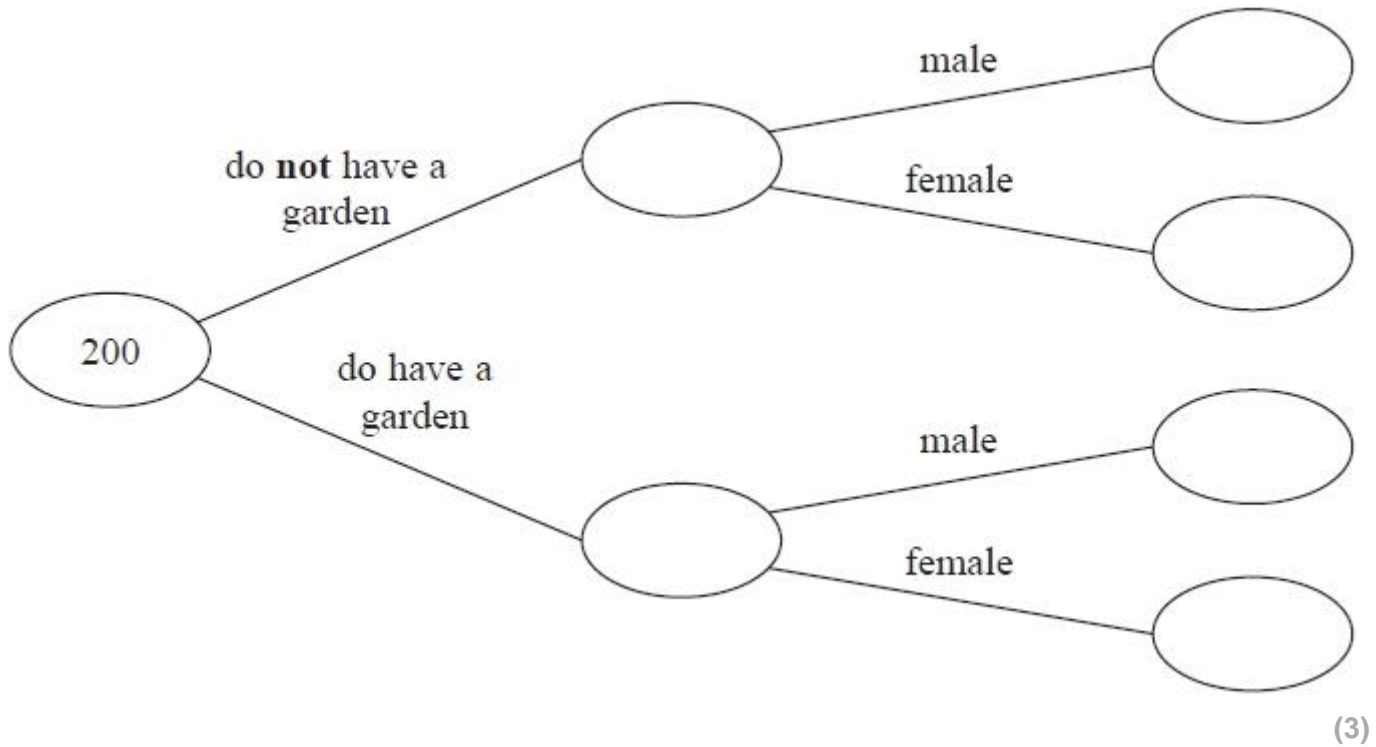
200 people live in a village.

23 people do **not** have a garden.

10 males do **not** have a garden.

95 people are male.

(a) Use this information to complete the frequency tree.



One of the people who does **not** have a garden is chosen at random.

(b) Write down the probability that this person is female.

.....
(2)

(Total for question = 5 marks)

Examiner's Report

Q1.

The cumulative frequency table in part (a) was usually completed correctly although, again, arithmetic errors were sometimes seen. Plotting of points and reading of scales in part (b) were usually carried out well although the usual translated forms were seen. Some students correctly plotted their points but then drew a line of best fit instead of a cumulative frequency graph. It was good to see most students plotting at the correct end points of the intervals. In part (c), the most common error was to read off their graph from time = 50 instead of at a cumulative frequency of 50. Part (d) caused more problems; many simply giving the reading from time = 63 without subtracting it from 100. Many misread the scales and used either time = 61.5 or read the cumulative frequency scale incorrectly. This resulted in the loss of both marks for this part of the question.

Q2.

Many students did not know where to plot the frequencies and it was common to see points plotted at the upper end of the class interval. These scored one mark. However, many went on to lose this mark as they either plotted one point incorrectly or joined the first and last point to make an "iceberg" effect. Those students who started by drawing a bar chart and then marking the centres of the tops of the bars and joining them tended to make fewer errors in plotting. In part (b), where answers were given, they tended to either correctly identify the modal class interval or write the incorrect answer of 40.

Q3.

The responses to this question were very mixed. When candidates knew how to tackle the question the use of the mid-interval values was very much in evidence but there were still some who used either the upper or the lower values of the class intervals. A significant number of candidates worked out the correct answer but then felt the need to round this to 28 on the answer line or to give the answer as the class interval itself. Those who had shown 28.25 in the working were not penalised for doing this. Some candidates realised that ' \bar{x} ' could be involved and did the appropriate calculations but then decided not to use these results, choosing instead to divide the total of the frequencies by the number of class intervals (a very common incorrect method) and gaining no marks.

Q4.

Many fully correct answers were seen. The usual misconception of dividing by 5 was seen in part (a), along with a more unusual error of using 2000 for each 'midpoint'.

Part (b) was well answered, with the only real error seen being a silly mistake for example 4 instead of 64 as the final entry,

In part (c) a few scatter graphs were drawn and several students plotted the midpoints. Almost all joined their points with smooth curves although line segments are acceptable.

For part (d) many correct answers were seen and follow through was allowed for all marks in this part of the question and the scale was used well. The most common errors seen were to use 70 instead of 64 as the total frequency or find the median instead of the interquartile range.

Q5.

The mode was not understood by many, with an almost random array of answers from any of those shown either as a frequency or as the number of badges. In contrast in part (b) there were many attempts to calculate fx from the table. Unfortunately many solutions were spoilt when the divisor used was either 6 or 15, rather than the correct 25. It was disappointing to find Higher level candidates who thought that 0×2 was 2.

In part (c) there were very few correct answers. Although some realised they had to find the total number of older girls by calculating 15×4.4 , even these failed to realise what to do with the result of this calculation.

Q6.

Very few candidates failed to construct an accurate box plot showing the given information in part (a). Some failed to draw a box whilst a minority showed all 5 pieces of information in a box.

Part (b) was very much less well done. Many candidates clearly appear not to understand the meaning of quartiles in the context of a problem and failed to grasp that they had to find $\frac{3}{4}$ of the data. The most common incorrect approach was to try to use the Weight values as frequency values.

For example $6.5 - 2.8 = 3.7$

Q7.

For part (a), some fully correct answers were seen whilst some students just plotted the frequency without considering frequency density. A few scale issues were seen with students starting at 0.2 instead of 0 or using 0.3 for every 2 cm. A few missed the width of the last interval and plotted 70 to 80 instead of 70 to 85

In part (b), there were fully correct answers or answers arriving at 19.1. The ability to split the rectangles was seen but not the ability to arrive at a total. Those trying to count squares generally made little headway in this part of this question. Some students did arrive at 19.1 but failed to round to a whole number of eggs. A common error was to average 20 and 17 and give 18.5 as the final answer.

Q8.

In part (a) the vast majority of candidates were unable to communicate that a stratified sample is proportional in its nature. Many thought the essence of a stratified sample is purely about subdividing the population into groups. Common incorrect answers referred to taking equal amounts from each group or describing random or systematic sampling techniques. The quality of written communication was poor and candidates clearly found it difficult to express their understanding.

In contrast part (b) was well answered. In the cases where candidates only gained 1 mark this was either because they left their answer as 26.2 or rounded up to 27 people. Of those candidates who failed to score many of them often used the correct 3 values but reversed the order of division or multiplication.

Q9.

This proved to be a good opening question with the most students scoring all 3 marks. The most common error was to just write down the discount of £150 as the answer.

Q10.

Students overwhelmingly went for 30% of 1295 and rounded their answer. Of those that did understand that the question was about finding 30% of a number given 70% of the number, most could work out the correct answer, although a few left it as 1850, the total number of people.

Q11.

A good proportion of students showed an understanding of "reverse percentages" and were able to use 88% or 0.88 to answer the question successfully. Some students identified the need to use 88% or 0.88 but not how to use it correctly. They usually gained some credit for this. There were, as expected, a large number of students who merely increased 1.1 kg by 12% so 1.232 kg was a commonly seen incorrect answer.

Q12.

Generally the points were plotted correctly in part (i) and then the vast majority of candidates knew that the relationship was one of positive correlation. Part (c) was also well done with nearly all candidates being able to give a value within the required range, with or without the use of a line of best fit.

Q13.

For part (a) most candidates were able to add the probabilities to obtain 0.76. Many understood that the probabilities should add to 1 and were able to subtract to get 0.24 but then this was commonly divided by 3 rather than 4. The divide by 3 resulted from the 3x in the table which suggests that centres need to be aware of the link to algebra rather than the old style tables which required finding the missing box. Those who did manage to divide by 4 often got an answer of 0.6 rather than 0.06. Some failed to note the decimal point and divided 24 by 4, without noting that this was then a percentage.

Few candidates gained full marks in part (b). Many scored one mark for one correct product, most thinking that the only possibilities were 3+5 and 4+4. Many did not consider 5+3 as well. Four pairs were often identified rather than three. Having made a choice of pairs, candidates frequently added the probabilities rather than multiplying. Common wrong answers seen were 0.46 and 0.42. A minority used a two-way table clearly showing the three ways of scoring 8 but generally assumed the probabilities in the table were all equally likely, ignoring the information in part a and thus producing an incorrect answer.

Q14.

Part (a) was usually well done with the majority gaining full marks. Weaker students gave incorrect values on the right hand branches, perhaps reversing the 0.3 and 0.7 on the lower set.

In part (b) many gained a single mark for $0.3 \times 0.7 (=0.21)$, but some attempted to add these values. Students who knew to multiply two sets of values usually went on to gain full marks.

Q15.

Most candidates were able to get at least 1 mark in part (a) and many scored both. The principal error was that the sum of the probabilities on branches was not the unity it ought to have been.

Part (b) was well answered – many candidates knew that it was a multiply and had their calculators to get the correct answer. Some candidates added to get a probability greater than 1.

Part (c) was less successfully answered as often candidates only considered 2 of the 3 cases. The omitted case tended to be the one already found in (b), so candidates were generally interpreting the demand of 'at least one' as 'exactly one'. It was pleasing to see some candidates using the economical $1 - 0.4 \times 0.5$.

Q16.

This was very well understood and full marks were gained by the vast majority of students in both parts.

In part (a) a minority of students put the frequencies in the wrong order in (usually) two of the right-hand boxes; some gave the frequencies incorrectly as probabilities of 200.

13

In part (b) the most common incorrect answer was $\frac{13}{200}$ (which gained 1 mark) where students had not read the question properly. Very rarely did students use incorrect notation for the probability.

Mark Scheme

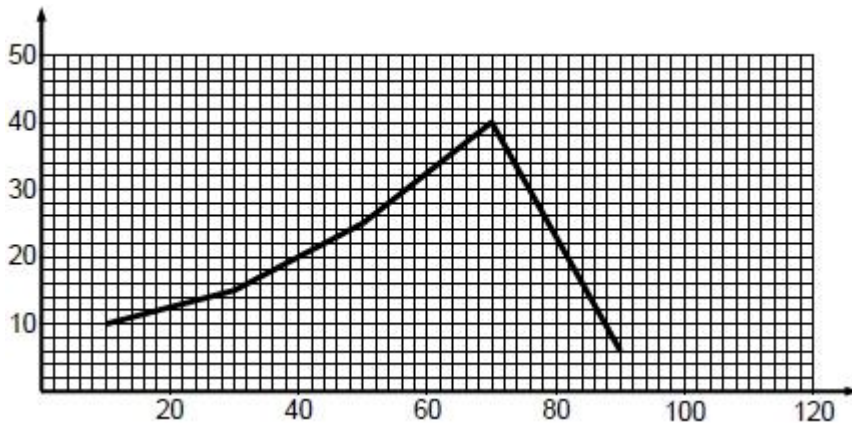
Q1.

PAPER: 1MA0 1H				
Question	Working	Answer	Mark	Notes
(a)		4, 20, 56, 80, 94, 100	1	B1 cao
(b)		graph	2	M1 ft from their table for at least 5 points plotted correctly at the ends of the intervals provided table values are cumulative, condoning one arithmetic error, or if the shape of the graph is correct for 5 or 6 points plotted not at the ends but consistently within each interval and joined A1 cao for correct graph with points joined by curve or straight line segments
(c)		47 to 49	1	B1 for 47 to 49 or ft their cf graph at cf = 50
(d)		13 to 16	2	M1 for reading a value from their cf graph at time = 63 (84 to 87) A1 for answer in the range 13 to 16 or ft from their graph

Q2.

Question	Working	Answer	Mark	Notes
(a)		Frequency polygon	2	B2 correct frequency polygon (B1 for points plotted correctly but not joined OR for points plotted at the correct heights, consistently placed within the class intervals (including ends) and joined OR for an otherwise correct frequency polygon with one point incorrect OR correct frequency polygon with first and last points joined directly) NB: ignore parts of graph drawn to the left of the 1st point or the right of the last point; ignore any histograms drawn.
(b)		$60 < A \leq 80$	1	B1 ft frequency polygon

(a)



Q3.

Question	Working	Answer	Mark	Notes
	$5 \times 3 + 15 \times 8 + 25 \times 11 + 35 \times 9 + 45 \times 9$ $= 1130$ $1130 \div 40$	28.25	4	M1 for finding $\sum fx$ with x consistent within intervals (including the end points) allow 1 error M1 (dep) for use of all correct mid-interval values M1 (dep on first M1) for $\sum fx \div 40$ or $\sum fx \div \sum f$ A1 for 28.25 or $28 \frac{1}{4}$

Q4.

Question	Working	Answer	Mark	Notes
(a)	$8 \times 1000 = 8000$ $14 \times 3000 = 42000$ $28 \times 5000 = 140000$ $10 \times 7000 = 70000$ $4 \times 9000 = 36000$ $296000 \div 64$	4625	4	M1 for finding at least 4 products fx consistently within interval (including end points) M1 (dep) for use of at least 4 correct midpoints M1 (dep on first M1) for $\Sigma fx \div 64$ A1 cao
(b)		8,22,50,60,64	1	B1 all 5 correct
(c)		Cumulative frequency graph	2	M1 for at least 4 of '5 points' plotted consistently within each interval, and joined by curve or line segments providing no gradient is negative. A1 for correct cumulative frequency graph
(d)		2500 - 3000	2	M1 dep on cf graph for readings at $cf = 16$ or 16.25 and $cf = 48$ or 48.75 A1 ft from cf graph

Q5.

5MB1H/01 June 2015				
Question	Working	Answer	Mark	Notes
(a)		1	1	B1 cao
(b)		2.4	3	M1 for $\Sigma(\text{number of books} \times \text{frequency}) (=60)$ M1 for " $60 \div 25$ " A1 cao SC B2 for an answer of 2.48
(c)		3.15	3	M1 for $15 \times 4.4 (=66)$ M1 for a complete method eg (" $60 + 66 \div (15 + 25)$ ") A1 cao

Q6.

Question	Working	Answer	Mark	Notes
(a)		Box plot	2	B2 for correct box plot (B1 for box plot with at least 3 pieces of information correctly plotted) Note: There must be a box
(b)	$75\% \times 60$	45	2	M1 for 0.75×60 oe A1 cao [SC: B1 for an answer of 15 if M0 scored]

Q7.

Question	Working	Answer	Mark	Notes
(a)	$12 \div 20 = 0.6$ $20 \div 10 = 2$ $17 \div 10 = 1.7$ $6 \div 15 = 0.4$	Correct histogram	3	B3 for fully correct histogram (B2 for 3 correct blocks or all 4 frequency \div class interval, y-axis labelled and 1 correct block) (B1 for 2 correct blocks of different widths or for correct key eg $1\text{cm}^2 = 1$ egg or for frequency \div class interval for at least 3 frequencies) Due to scale accept to within 1mm on plotting
(b)		19	3	M1 for splitting one of relevant rectangles or for $\frac{7}{10} \times 20 (=14)$ or $\frac{3}{10} \times 17 (=5.1)$ M1 for (area of 53 – 63 interval) \div (total area) $\times 55$ or for “14” + “5.1” A1 for 19

Q8.

PAPER: IMA0_2H				
Question	Working	Answer	Mark	Notes
(a)		Explanation	1	B1 for appropriate explanation eg “a sample in the same proportions as the population”
(b)		26	2	M1 for $\frac{314}{599} \times 50 (=26.2\dots)$ A1 cao

Q9.

PAPER: 5MB2H 01				
Question	Working	Answer	Mark	Notes
		350	3	M1 for finding 30% of 500 (=150) M1 dep for subtraction of discount from 500 A1 cao OR M1 for $1 - 0.3$ (= 0.7) M1 dep for $500 \times "0.7"$ A1 cao

Q10.

Question	Working	Answer	Mark	Notes
		555	3	M1 for recognising that 1295 is 70% eg $70\% = 1295$ M1 for $10\% = 1295 \div 7$ (=185) or $1\% = 1295 \div 70$ (=18.5) or $1295 \times \frac{3}{7}$ oe or $(1295 - 185) \div 2$ or $1295 \times \frac{10}{7}$ oe (=1850) A1 cao

Q11.

PAPER: 1MA0 2H				
Question	Working	Answer	Mark	Notes
		1.25	3	M1 $100 - 12$ (= 88) or 0.88 or $1.1 \div 88$ (= 0.0125) M1 for complete method, eg $1.1 \div 0.88$ A1 cao (SC B2 for 1250 as answer)

Q12.

Question	Working	Answer	Mark	Notes
(a)	See scatter graph	(12,14) and(17,20) plotted	1	B1 for correct plotting of both points
(b)			1	B1 Positive (accept a correct relationship)
(c)		16 to 18	2	B2 16 – 18 (M1 for a single line segment from $m=11$ to $m = 16$ within overlay or a vertical line drawn from $m = 15$ A1 for an answer in the range 16-18 or ft their line of best fit ± 2 mm)

Q13.

Question	Working	Answer	Mark	Notes
(a)	$1 - (0.3 + 0.21 + 0.16 + 0.09)$ $0.24 \div 4$	0.06	3	M1 for $1 - (0.3 + 0.21 + 0.16 + 0.09)$ or $1-0.76$ or 0.24 M1 dep for "0.24" $\div 4$ A1 cao
(b)	0.3×0.16 $+ 0.16 \times 0.3$ $+ 0.21 \times 0.21$	0.1401	3	M1 for one correct product or 3 correct pairs identified by scores or probabilities. Ignore 4+4 repeated with no other errors. M1 for all correct products with intention to add A1 for 0.1401

Q14.

PAPER: IMA0_2H				
Question	Working	Answer	Mark	Notes
(a)		0.3 0.3, 0.7, 0.3	2	B1 for 0.3 as first spin oe B1 for 0.3, 0.7, 0.3 in correct positions for second spin oe
(b)		0.42	3	M1 for '0.3' \times '0.7' or $0.7 \times '0.3'$ (=0.21) M1 for '0.3' \times '0.7+0.7 \times '0.3' (OR M2 for $1 - 0.7^2 - 0.3^2$) A1 for 0.42 oe

Q15.

Question	Working	Answer	Mark	Notes
(a)		0.8 0.6 0.2 0.4 0.5 0.5	2	B2 for all 6 correct probabilities (B1 for two correct probabilities)
(b)	0.6×0.8	0.48	2	M1 for ' $0.6' \times '0.8'$ ft probability tree diagram A1 cao
(c)	$1 - (0.4 \times 0.5)$ $1 - 0.2$ OR $0.6 \times 0.8 + 0.6 \times 0.2 + 0.4 \times 0.5$	0.8	3	M2 for $1 - '0.4' \times '0.5'$ ft probability tree diagram A1 cao OR M2 for ' $0.6' \times '0.8' + '0.6' \times '0.2' + '0.4' \times '0.5'$ (M1 for any two of ' $0.6' \times '0.8'$ ', ' $0.6' \times '0.2'$ ', ' $0.4' \times '0.5'$ ' added) A1 cao

Q16.

Question	Working	Answer	Mark	Notes
(a)		23, 177 10, 13, 85, 92	C3 (C2 (C1	Completes all information correctly. 3 or 4 correct frequencies or all correct probabilities) 2 correct frequencies)
(b)		$\frac{13}{23}$	M1 A1	ft oe for $\frac{a}{23}$, $a < 23$ or $\frac{13}{b}$, $b > 13$ ft oe from (a)