Objective: **Complete iGCSE questions on statistical questions.**

(c) Use your graph to find

    (i) the median mass,

....

    (ii) the interquartile range.

....

3	(a)	(i)	60		1	
		(ii)	8		2	**B1** for [lq =] 56 or [uq =] 64
		(iii)	12		2	**M1** for 188 seen

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6	(a)	166 or 165.6 to 165.7	2	**M1** for correct use of mid-pts at lea 157.5, 162.5, 167.5, 172.5,182.5)

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11 A farmer sorts the grapefruit he grows into sizes, according to their diameter.
The diameters, d cm, of 170 grapefruit are shown in the table.

Size	Small	Medium	Large	Very Large
Diameter (d cm)	$9 < d \leqslant 10$	$10 < d \leqslant 12$	$12 < d \leqslant 14$	$14 < d \leqslant 17$
Frequency	10	50	65	45

(a) Calculate an estimate of the mean diameter of the grapefruit.

....

Question	Answer	Marks	Partial Marks
11(a)	12.9 or 12.86 to 12.87	2	**M1** for evidence of at least three mid-inter values 9.5, 11, 13, 15.5 soi by 95, 550, 845, 697.5 or 2187.5

3 **(a)** 12 students take part in a quiz.
The table shows the number of correct answers given by each student.

Student	A	B	C	D	E	F	G	H	I	J	K	L
Number of correct answers	7	6	9	5	6	4	7	8	4	10	9	3

Find

(i) the median,

....

(ii) the lower quartile,

....

(iii) the number of students with a smaller number of correct answers than the lower quartile.

....

3(a)(i)	6.5	1	
3(a)(ii)	4.5	1	
3(a)(iii)	3	1	

4   **(a)**   The mass, x grams, of each of 100 oranges is found.
The results are shown in the table.

Mass (x grams)	Frequency
$0 < x \leqslant 100$	4
$100 < x \leqslant 140$	14
$140 < x \leqslant 180$	22
$180 < x \leqslant 250$	35
$250 < x \leqslant 300$	25

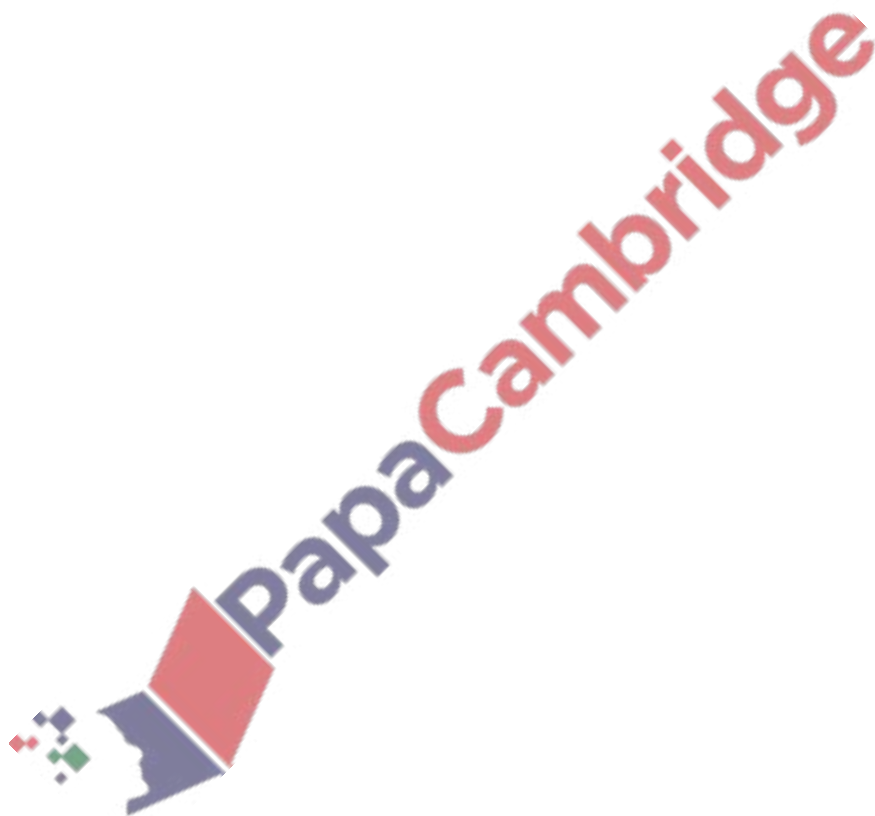   **(i)**   Calculate an estimate of the mean mass of the oranges.

....

4(a)(i)	198		**2**	**M1** for 3 or more 50, 120, 160, 21

Question	Answer	Marks	Partial Marks
1(a)	10	1	
1(b)	6 nfww	2	**B1** for 17 or 11 seen
1(c)	10	1	
1(d)	15	1	
1(e)	14.5 or 14.51 to 14.52	2	**M1** for Σxf soi by e.g. 450
1(f)	It is the smallest oe	1	

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4(a)	27.7 or 27.70 to 27.71	2	**M1** for at least 3 midpoints soi
4(b)	Correct cf curve	5	Curve/polygon through (10, 0), (20, ... (25, 44), (30, 76), (35, 100), (40, 114 (50, 120) or **B4** for curve through 5 or 6 points 7 points with no curve or **B3** for 'correct curve' through all ... consistent points in interval or **B2** for all correct cfs or **B1** for 4 or 5 correct cfs. If 0 scored **SC1** for any cumulative frequency diagram.
4(c)(i)	26 to 28	1	Dep on increasing curve **FT**
4(c)(ii)	9 to 11.5	2	Dep on increasing curve **FT** **B1** for lq = 22 to 23.5 or uq = 32.5 t...
4(c)(iii)	10 to 15	2	Dep on increasing curve **FT** **B1** for 105 to 110 seen

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9   240 students take part in a charity run.
The table shows information about the times, t minutes, taken to complete the run.

Time (t minutes)	$20 < t \leqslant 40$	$40 < t \leqslant 50$	$50 < t \leqslant 55$	$55 < t \leqslant$
Number of students	20	70	120	30

(a)   Write down the time interval that contains the median.

.... $< t \leqslant$ ....

(b)   Calculate an estimate of the mean.

....

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Question	Answer	Marks	Partial Marks
9(a)	$50 < t \leqslant 55$	1	Allow e.g. 50 to 55
9(b)	50	2	**M1** for at least three of 30, 45, 52.5

Question	Answer	Marks	Partial Marks
1(a)	6	1	
1(b)	10	1	
1(c)	6	1	
1(d)	4	2	**B1** for LQ = 4 or UQ = 8
1(e)	5.55	2	**M1** for attempt at $\sum fx$ (3 or more terms correct)

6a)(i)	74	1	
6(a)(ii)	18	2	**B1** for 64 or 82
6(a)(iii)	38	2	**B1** for 82

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6(b)(i)	Correct graph	3	**B1** for minimum at $(10, h)$ wh $h < 30$, lq and median correct **B1** for uq correct **B1** for maximum correct
6(b)(ii)	Answer in range 50 to 60	2	**B1** for 74 or 14 to 24
6(b)(iii)	[A is] steeper oe	1	

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4(a)	39.8 or 39.81 to 39.82	2	**M1** for at least 5 correct mid-poin
4(b)	[41], 73, 117, 167, 232, 280, [300]	1	
	In parts (c), (d) and (e), marks can only be earned with an increasing curve		
4(c)	Correct curve (10, 41) (20, 73) (30, 117) (40, 167) (60, 232) (80, 280) (100, 300)	3	**M1** for horizontal plot correct **M1** for at least 6 vertical plots fro table correct

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4(d)(i)	35 to 38	1	
4(d)(ii)	35 to 39	2	**B1** for [UQ =] 56 to 59 or [LQ =] 20 to 21
4(e)	46 to 50	2	**B1** for 195 or 105 seen

3 The table shows the masses of 30 sheep.

Mass, m kg	$60 < m \leqslant 80$	$80 < m \leqslant 100$	$100 < m \leqslant 120$	$120 < m \leqslant 140$
Frequency	8	3	12	7

(a) Write down the modal group.

....

(b) Write down the class which contains the lower quartile.

....

(c) Maria says that the range of masses is 80 kg.

Explain why she is incorrect.

....

....

(d) Draw an accurate pie chart to show this information.

[
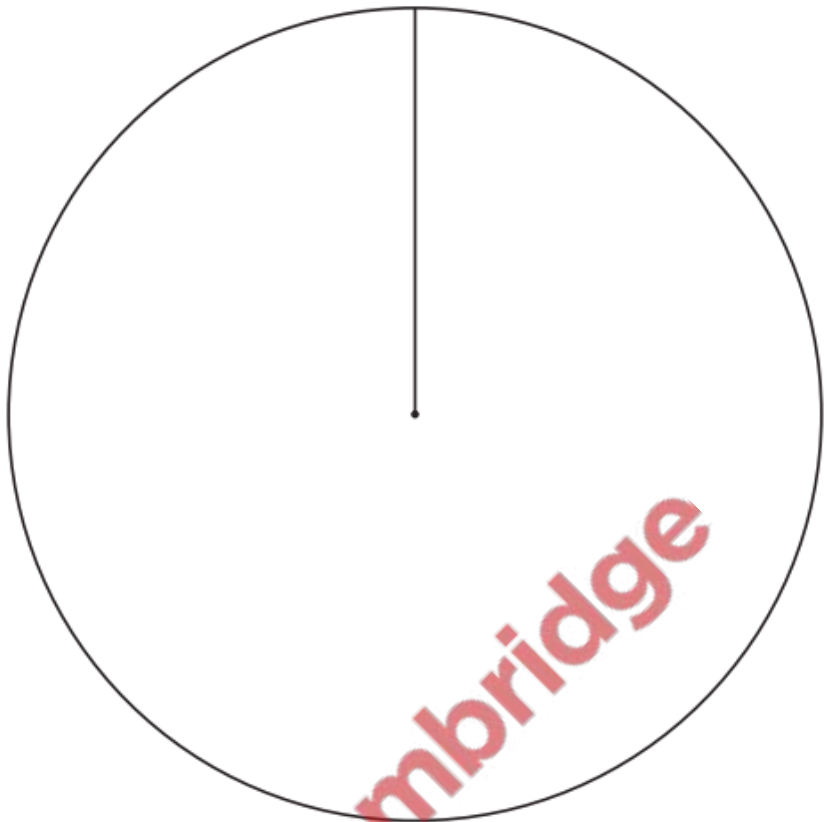
3(a)	$100 < m \leqslant 120$	**1**	
3(b)	$60 < m \leqslant 80$	**1**	
3(c)	Any correct statement	**1**	

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3(d)	Correct labelled pie chart (labels indicating masses)	**4**	**B3** for pie chart with all angl or **B2** for pie chart with two correct or **B1** for 2 correct angles cal **B1** for correct labels on secto

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5(a)	178 or 178.4 to 178.5	2	**M1** for evidence of mid-values
5(b)	[x =] 7 [y =] 18	3	**B2** for y = 18 or **M1** for ([x × 0] + y [× 1] + 30 × 2 + 45 × 3) ÷ 100 If 0 scored **SC1** for *their x + their y = 25*

5 (a) There are 200 students in a school.
The table shows information about their heights, h cm.

Height, h cm	$150 < h \leqslant 165$	$165 < h \leqslant 170$	$170 < h \leqslant 175$	$175 < h \leqslant 180$	$180 < h \leqslant 190$	$190 < h \leqslant 200$
Frequency	7	17	43	64	49	20

Calculate an estimate of the mean height.

.... cm [2]

(b) A biased die in the shape of a cube is numbered 0, 1, 1, 2, 3 and 3.
It is rolled 100 times.
The table shows the results.

Score	0	1	2	3
Frequency	x	y	30	45

The mean score is 2.13 .

Find the value of x and the value of y.

$x =$ ....

$y =$ .... [3]

(d) Use your curve in **part (c)** to find an estimate for

  (i) the median mark,

....

  (ii) the interquartile range.

....
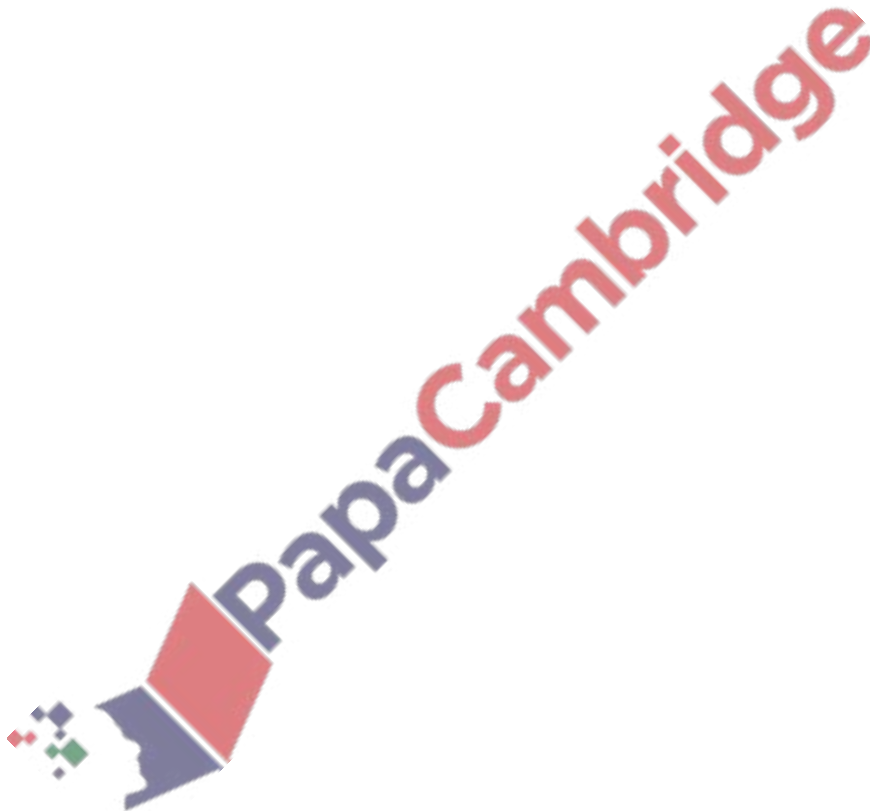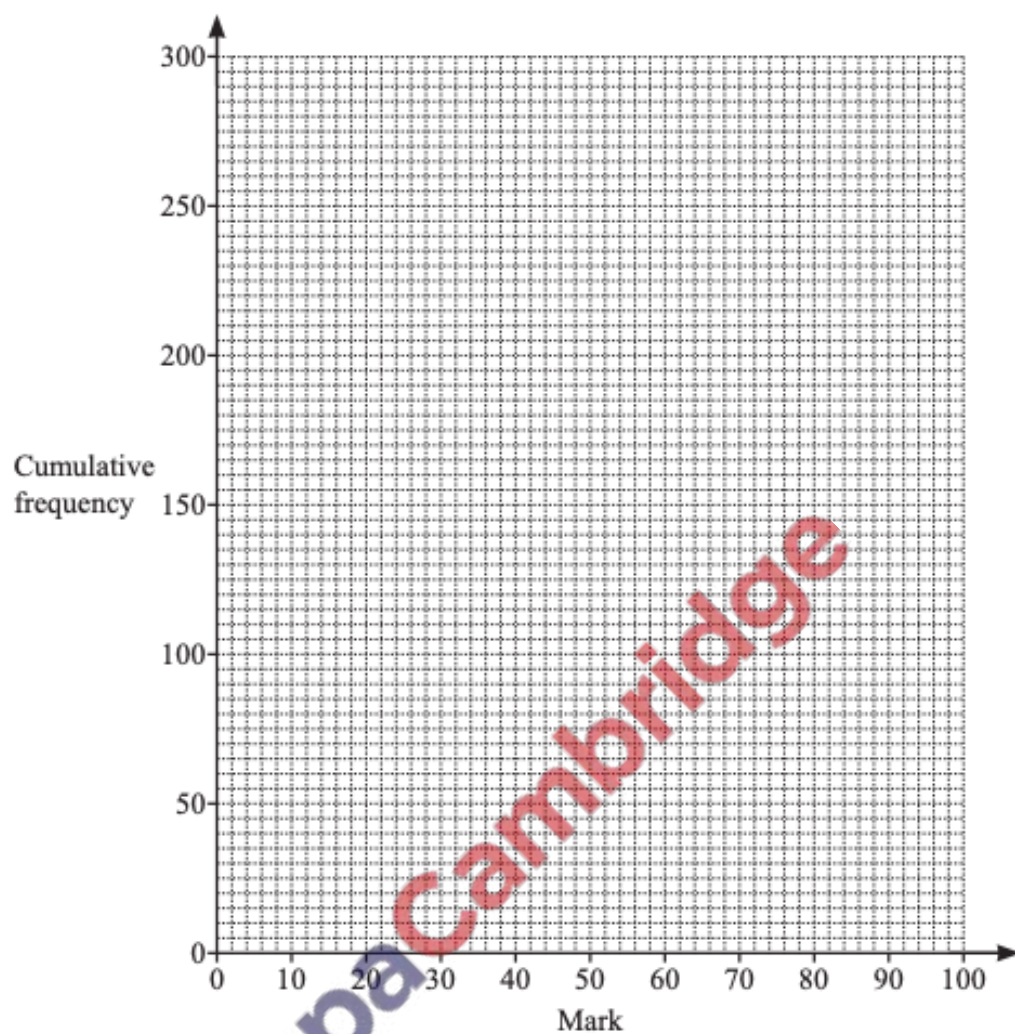
(e) 35% of the students pass the test.

Use your curve in **part (c)** to find an estimate of the minimum mark needed to pass.

....

(c) On the grid, draw a cumulative frequency curve.

[3]

4 The marks, x, of 300 students in a chemistry test are shown in the table.

Mark (x)	Frequency
$0 < x \leqslant 10$	41
$10 < x \leqslant 20$	32
$20 < x \leqslant 30$	44
$30 < x \leqslant 40$	50
$40 < x \leqslant 60$	65
$60 < x \leqslant 80$	48
$80 < x \leqslant 100$	20

(a) Calculate an estimate of the mean mark.

.... [2]

(b) Complete the cumulative frequency table.

Mark (x)	Cumulative frequency
$x \leqslant 10$	41
$x \leqslant 20$	
$x \leqslant 30$	
$x \leqslant 40$	
$x \leqslant 60$	
$x \leqslant 80$	
$x \leqslant 100$	300

[1]

(b) The table gives some information about 120 similar plants in location B.

Minimum height (cm)	Lower quartile (cm)	Median (cm)	Interquartile range (cm)	Range (cm)
10	34	50	28	90

(i) On the grid opposite, draw the cumulative frequency curve for the heights of the plants location B.

(ii) Use the curves to estimate how many **more** plants had heights of over 70 cm in location than in location B.

....

(iii) The heights of the plants in location A are more consistent than the heights of the plants location B.

By comparing the **shapes** of the curves, explain how you know this is true.

....

....

6   The cumulative frequency graph shows the heights, in centimetres, of 120 plants in location A.
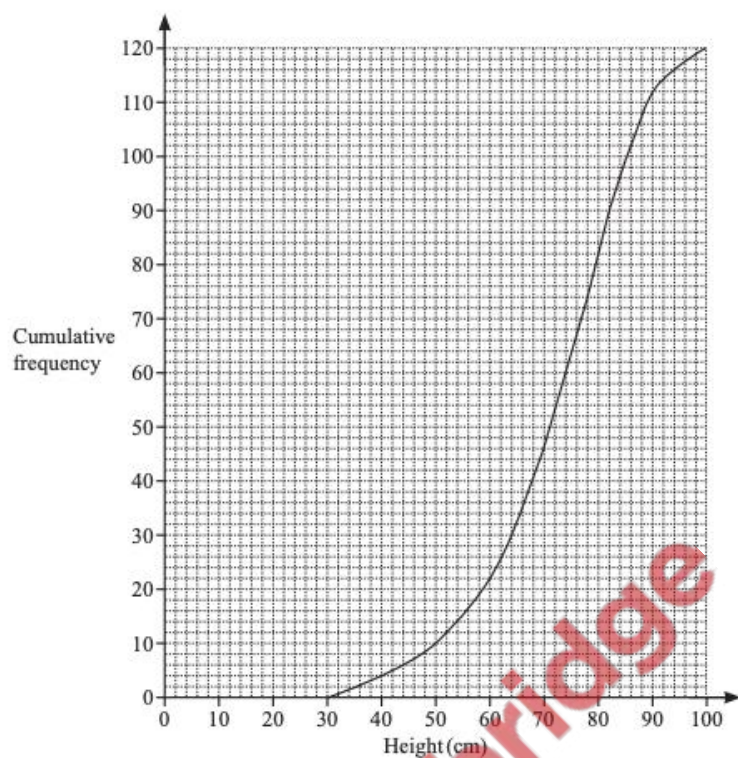
(a) Use the graph to estimate

    (i) the median,

            .... cm [1]

    (ii) the interquartile range,

            .... cm [2]

    (iii) the number of plants over 80 cm in height.

            .... [2]

1   A class of 40 students complete a science test.
     The table shows the marks of the 40 students.

Mark	0	1	2	3	4	5	6	7	8	9	10
Number of students	1	1	2	5	5	5	6	3	9	2	1

(a) Write down the mode.

.... [1

(b) Work out the range.

.... [1

(c) Find the median.

.... [1

(d) Find the interquartile range.

.... [2

(e) Calculate the mean.

.... [2

2(a)(i)	5	1	
2(a)(ii)	7.9	1	
2(a)(iii)	8	1	
2(a)(iv)	9	1	
2(b)(i)	1.5	1	
2(b)(ii)	1	1	
2(b)(iii)	1.4	1	
2(b)(iv)	18	2	**B1** for 102 stated
2(b)(v)(a)	20, 22, 18	3	**B1** for each
2(b)(v)(b)	1.71 or 1.712 to 1.713	2	**M1** for mid-values soi
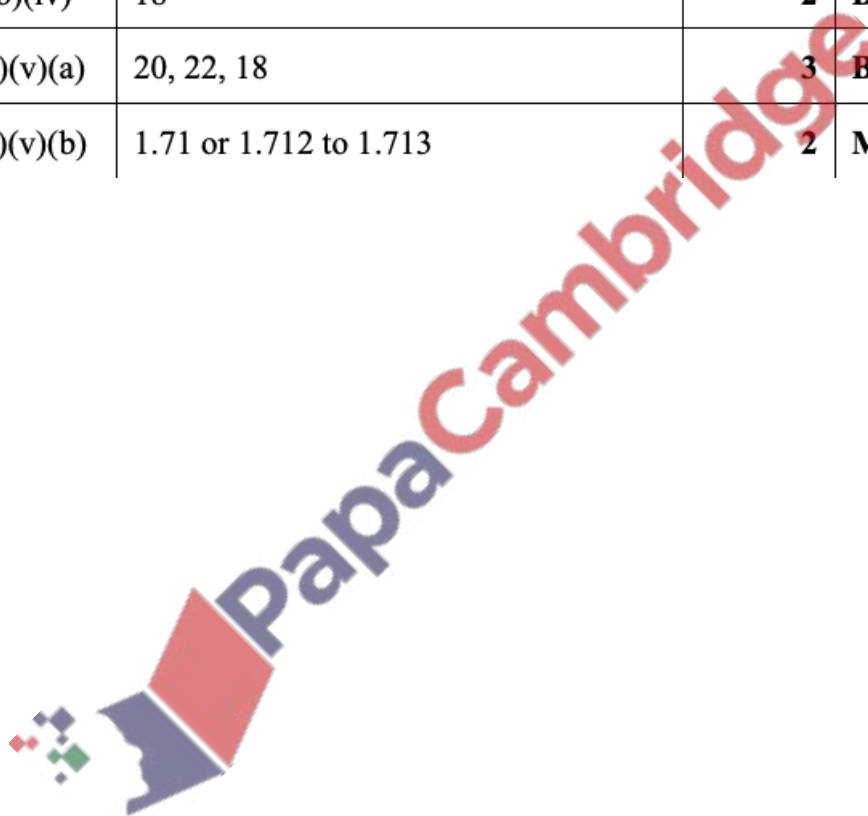
(i) Find the median.

.... kg [1]

(ii) Find the lower quartile.

.... kg [1]

(iii) Find the interquartile range.

.... kg [1]

(iv) Find the number of parcels with a mass of more than 3 kg.

.... [2]

(v) **(a)** Use the cumulative frequency curve to complete the frequency table.

Mass (m kg)	$0 < m \leqslant 1$	$1 < m \leqslant 1.5$	$1.5 < m \leqslant 2$	$2 < m \leqslant 3$	$3 < m \leqslant 4$
Frequency	30	30			

[3]

(b) Use the frequency table to calculate an estimate of the mean.

.... kg [2]

2   (a) These are Tom's ten homework marks.

8   7   10   8   9   5   8   10   6   8

Find

(i)   the range,

.... [1]

(ii) the mean,

.... [1]

(iii) the median,

.... [1]

(iv) the upper quartile.

.... [1]

(b) The mass, m kg, of each of 120 parcels is recorded.
     The cumulative frequency curve shows the results.

Cumulative frequency

Mass (kg)
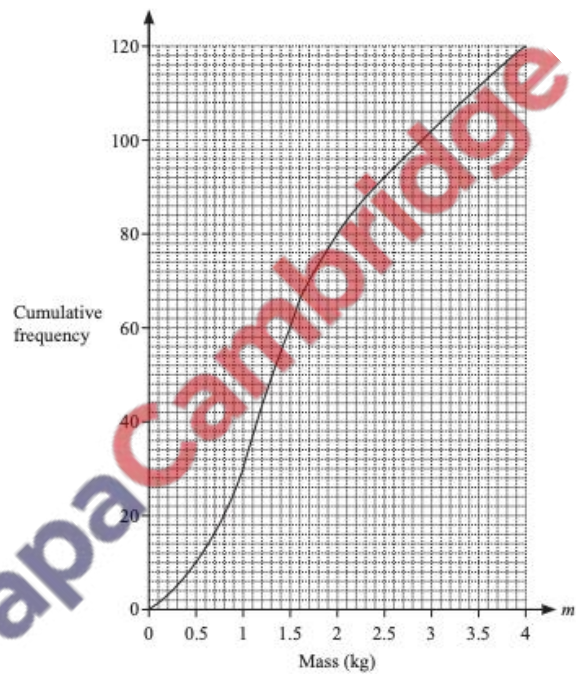
(c) Use your cumulative frequency curve to estimate

    (i) the median height,

....

    (ii) the interquartile range,

....

    (iii) the number of plants with a height of more than 37 cm.

....
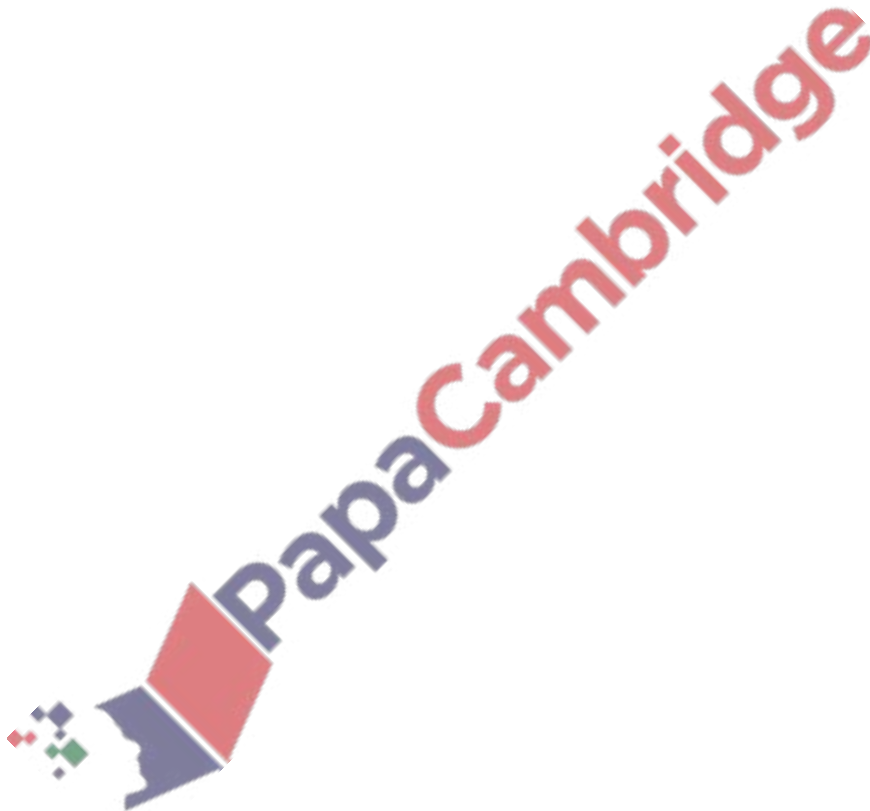
4 Rani planted some seeds in her garden.
After two months she measured the heights, h cm, of each of 120 plants.

The results are shown in the table.
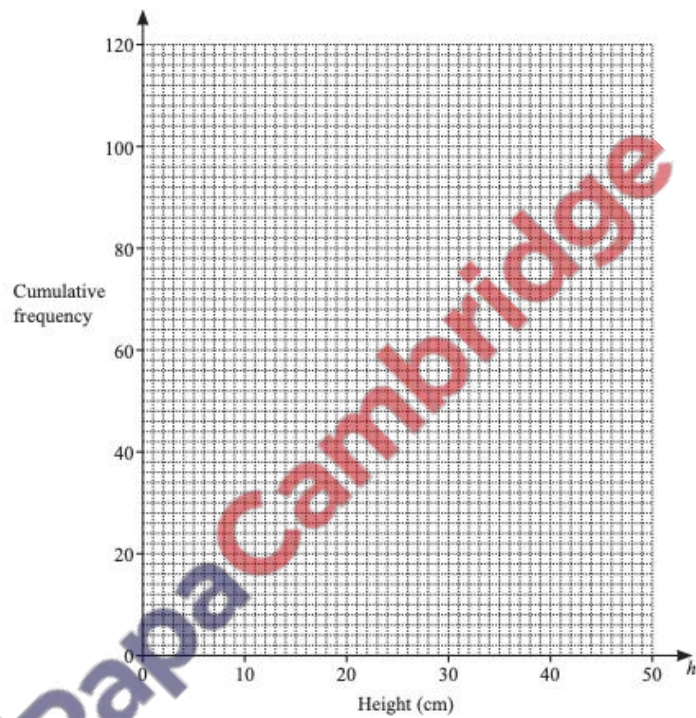
Height (h cm)	$0 < h \leqslant 10$	$10 < h \leqslant 20$	$20 < h \leqslant 25$	$25 < h \leqslant 30$	$30 < h \leqslant 35$	$35 < h \leqslant 40$	$40 < h \leqslant 50$
Frequency	0	16	28	32	24	14	6

(a) Calculate an estimate of the mean height.

.... cm [2]

(b) Draw a cumulative frequency curve for this information.

[5]

1 Gunter keeps chickens.
He records the number of eggs he collects each day for 31 days.
These are the results.

Number of eggs	10	11	12	13	14	15	16	17	18	19	20
Number of days	5	3	2	3	2	3	2	4	4	1	2

(a) Write down the range of the numbers of eggs.

.... [1]

(b) Find the inter-quartile range.

.... [2]

(c) Write down the mode.

.... [1]

(d) Find the median.

.... [1]

(e) Find the mean.

.... [2]

(f) Explain why the mode is not the best measure of average to represent these results.

.... [1]

Question	Answer	Marks	Partial Marks
4(a)(i)	1 | 7 8 9 9 2 | 0 1 1 1 1 2 2 3 4 5 e.g. 2|3 = 23	3	**B1** for each row **B1** for key
4(a)(ii)	21 19	2	**B1** for each
4(a)(iii)	102.8 to 102.9	2	**M1** for $\dfrac{4}{14}$ oe or $\dfrac{360}{14}$ oe
4(b)(i)	2.4	1	
4(b)(ii)	0.9	2	**B1** for 3 or 2.1 seen
4(b)(iii)	20	2	**M1** for 180 seen
4(c)(i)	253.125 or 253.13 or 253.1 or 253	2	**M1** for evidence of at least two mi 150, 225, 325 soi by e.g. 50625

Find

(i) the median,

.... litre

(ii) the inter-quartile range,

.... litre

(iii) the number of students who estimated more than 3.5 litres.

....

(c) 200 students estimated the area, $y\,\text{m}^2$, of a field.
The table shows the results.

Area ($y\,\text{m}^2$)	$100 < y \leqslant 200$	$200 < y \leqslant 250$	$250 < y \leqslant 400$
Frequency	25	100	75

(i) Calculate an estimate of the mean.

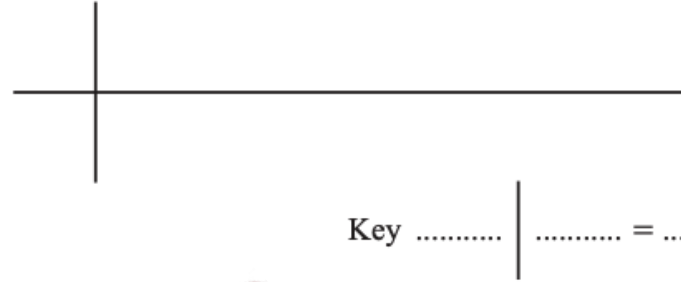..................................... m

(b) 200 students estimated the capacity, x litres, of a container.
The results are shown in the cumulative frequency curve.
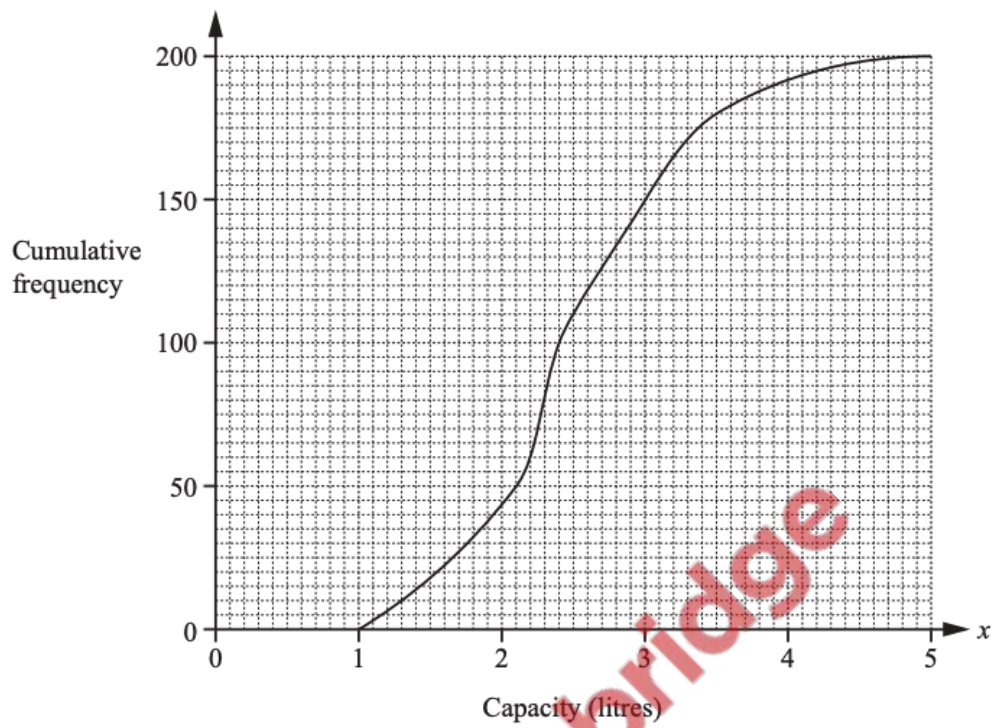
4 **(a)** The list shows the temperature, in degrees Celsius, at noon in Paris on each of 14 days.

19	18	21	21	23	21	22
20	24	25	22	21	19	17

(i) Construct an ordered stem and leaf diagram to show this information, including the key.

Key .... | .... = ...

(ii) Find the median and the lower quartile.

median = ...

lower quartile = ...

(iii) Find the angle on a pie chart that represents the number of days the temperature was less than 20 °C.

....

2(a)	31.1		2	**M1** for evidence of at least 3 correct midp
2(b)(i)	[7], 20, 40, 72, 100		1	
2(b)(ii)	Correct Graph		3	**B1** for plotting *their* points at upper grou points must be increasing vertically) **B1** for 4 or 5 correct **FT** vertical plots (m increasing)
2(c)(i)	32.5 to 34.5		1	**FT** *their* graph, dependent on increasing
2(c)(ii)	16.5 to 20		2	**FT** *their* graph, dependent on increasing **B1** for UQ = 40.5 to 42 or LQ = 22 to 24 or **M1** for *their* UQ – *their* LQ
2(c)(iii)	3 to 4		3	**FT** *their* graph, dependent on increasing **M2** for *their* 55 th percentile (34 to 36) a 45 th percentile (31 to 33) or **M1** for *their* 45th percentile (31 to 33) 55th percentile (34 to 36) or **SC3** for e.g. 32 to 35

(ii) On the grid below, draw the cumulative frequency curve.

Cumulative frequency (y-axis, 0 to 100)
Height (cm) (x-axis, 0 to 50)
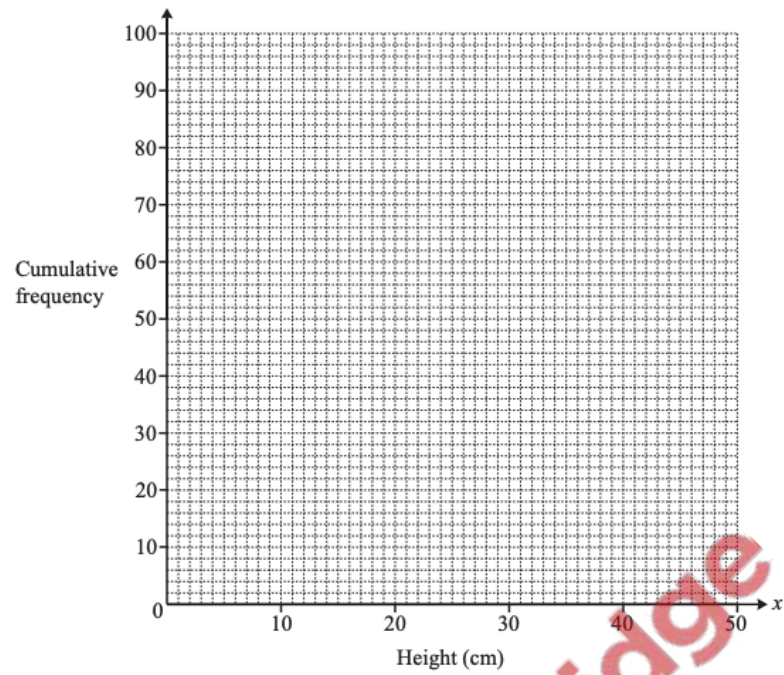
[3]

(c) Use your graph in **part (b)(ii)** to find estimates for

(i) the median height,

.... cm [1]

(ii) the interquartile range,

.... cm [2]

(iii) the range of heights of plants that are between the 45th and the 55th percentile.

.... cm [3]

2 **(a)** The heights, x cm, of some plants are shown in the table.

Height (x cm)	Frequency
$0 < x \leqslant 10$	7
$10 < x \leqslant 20$	13
$20 < x \leqslant 30$	20
$30 < x \leqslant 40$	32
$40 < x \leqslant 50$	28

Calculate an estimate of the mean height of the plants.

.... cm [2]

(b) **(i)** Complete the cumulative frequency table for the plants.

Height (x cm)	Cumulative Frequency
$0 < x \leqslant 10$	7
$0 < x \leqslant 20$	
$0 < x \leqslant 30$	
$0 < x \leqslant 40$	
$0 < x \leqslant 50$	

[1]

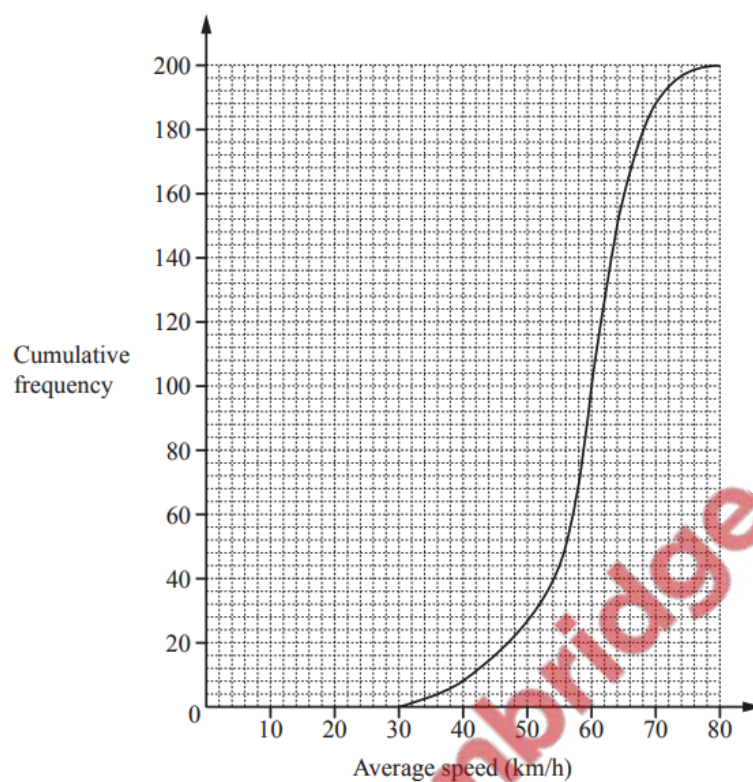**6** The heights of 400 students are given in the table.

Height (h cm)	Frequency
$145 < h \leqslant 155$	26
$155 < h \leqslant 160$	66
$160 < h \leqslant 165$	82
$165 < h \leqslant 170$	118
$170 < h \leqslant 175$	82
$175 < h \leqslant 190$	26

(a) Calculate an estimate of the mean height of a student.

....
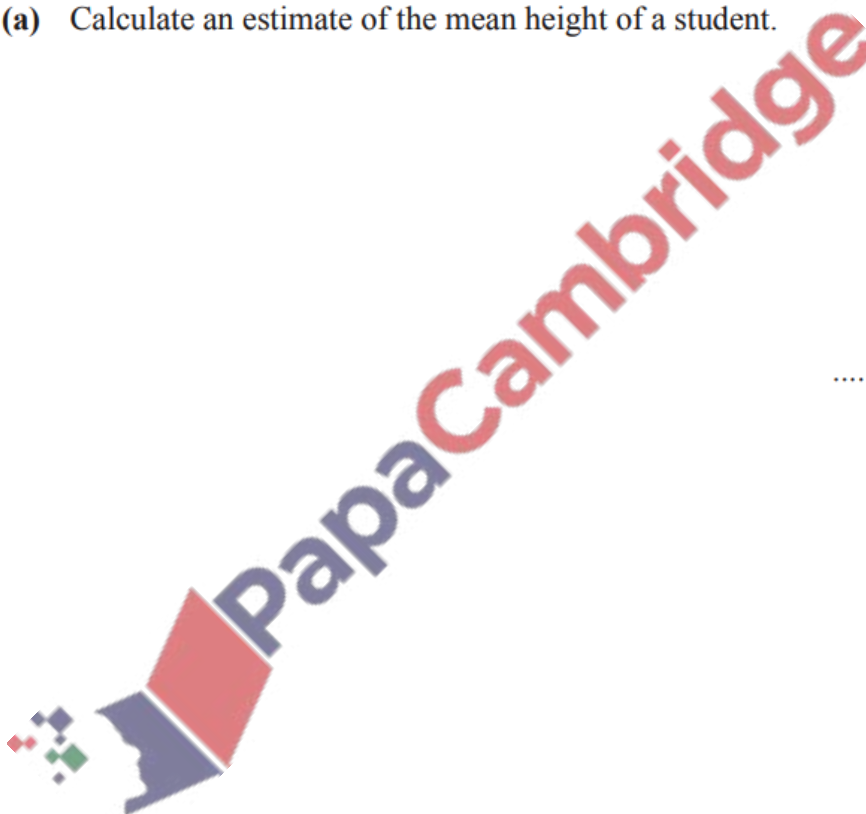
3 **(a)** The cumulative frequency curve shows information about the average speeds of 200 cars on the same journey.

Cumulative frequency

Average speed (km/h)

(i) Find the median.

.... km/h [1]

(ii) Find the inter-quartile range.

.... km/h [2]

(iii) Find the number of cars with an average speed of more than 70 km/h.

.... [2]

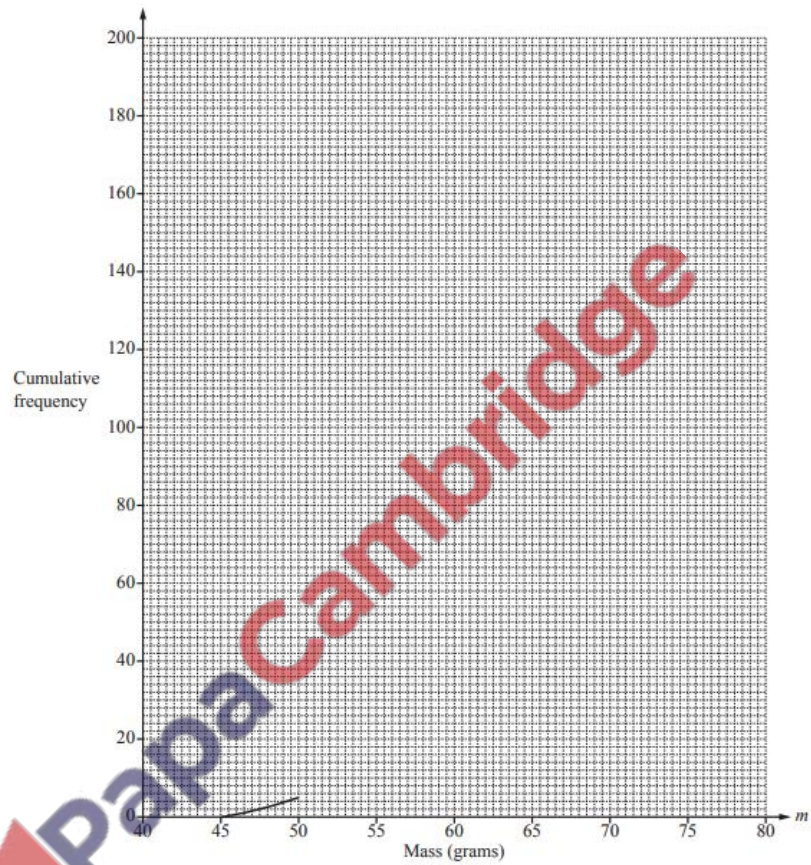| Question		Answer	Mark	Part Marks
12 (a)		63.6	2	**M1** for midpoints (47.5, 52.5, 57.5, 62. 72.5, 77.5) soi
(b)		Correct Curve	5	**B4** for 5 points correct and joined or f correct or **B3** for at least 3 correct points or **B2** for all correct cfs 5, 24, 58, 11 200 seen or **B1** for at least 3 correct cfs or for i curve with 6 points plotted at upper b If 0 or 1 or 2 scored, **SC3** for **all** point but consistently translated to mid-inte lower bound.
(c)	(i)	63 to 64	1	Dependent on increasing curve
	(ii)	8.5 to 10.5	2	**B1** for[l.qtile. =] 58.5 to 59.5 or [u. to 69 Dependent on increasing curve

12 The table shows the masses in grams of 200 eggs.

Mass (m grams)	$45 < m \leqslant 50$	$50 < m \leqslant 55$	$55 < m \leqslant 60$	$60 < m \leqslant 65$	$65 < m \leqslant 70$	$70 < m \leqslant 75$	$75 < m \leqslant 80$
Frequency	5	19	34	58	46	29	9

(a) Calculate an estimate of the mean mass.

.... g [2]

(b) On the grid, complete the cumulative frequency curve for the information in the table.

[5]