The City School

North Nazimabad Boys Campus

Math
Class 11

STATISTICS BASICS
Mean, Median, Mode

1. The weekly wages of the people who work in a small factory are given in the table below:

Weekly Wage ($)	200	220	360	500
Number of People	9	8	2	1

Find, for the the distribution of weekly wages,

(a) the mode (b) the median (c) the mean

2. Eleven people work for a company.
Five officers have a car allowance of $10000.
Six managers each have a car allowance of
$12 000, $18 000, $20 000, $24 000, $28 000, $35 000
State: (a) the median car allowance
(b) the mode of this distribution
(c) the mean car allowance

3. The table below shows the number of children living in the houses on the road

Number of Children	0	1	2	3	4	5	6
Number of Houses	3	7	5	4	0	0	1

Find (a) the modal number of children
(b) the median number of children
(c) the mean number of children

4. The number of goals scored in 20 football matches were

5 0 5 4 1 0 5 5 1 3
4 5 0 0 5 5 3 2 5 4

(a) Complete the table

Number of Goals		Frequency
0		
1		
2		
3		
4		
5		

(b) Using the axes represent the information as a bar chart.
(c) State: i. the median ii. the mode iii. the mean number of goals

5. The temperatures, at noon, on five days were

$-2℃,\ -1℃,\ 1℃,\ -2℃,\ 5℃$

(a) Find the median temperature
(b) Calculate the mean temperature
(c) The temperature, at noon, on another day was x ℃.
The mean temperature for six days was 1.5℃.
Find the value of x.

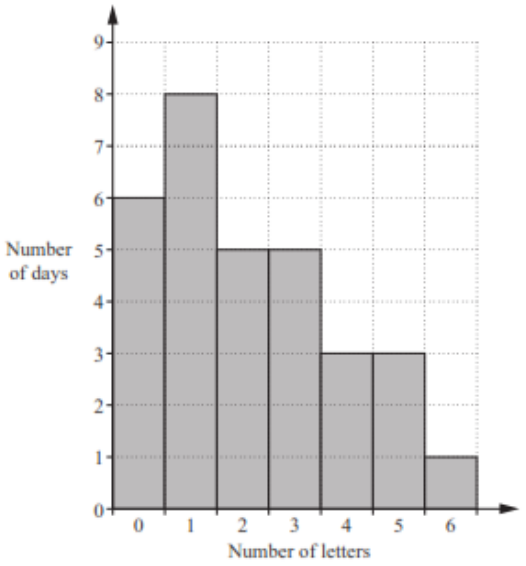
6. Some children were asked how many television programmes they had watched on the previous day. The table shows the results.

Number of programmes watched	0	1	2	3
Number of children	7	3	1	y

(a) If the median is 2, find the value of y.
(b) If the median is 1, find the greatest possible value of y.

Bar Graphs

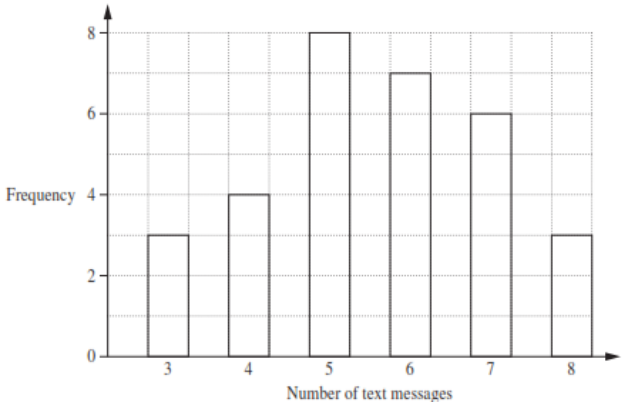
(b) The frequency diagram shows the distribution of the number of letters received by each day over a 31 day period.



For this distribution, find

(i) the mode, **(ii)** the median. Jun2013P2

13 Jamil recorded the number of text messages sent by the students in his class on one day. The results are shown in the bar chart.



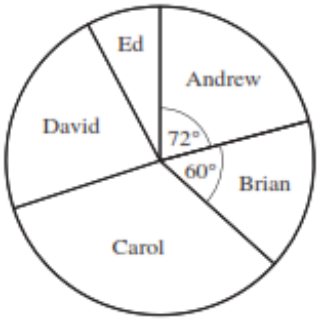
Use the bar chart to find

(a) the number of students in Jamil's class, **(b)** the median number of text messages sent,

(c) the modal number of text messages sent. Jun2011P1

Pie Charts

6 The pie chart, not drawn accurately, represents the weekly income of the five employees in a small British company in 2009.



Andrew's weekly income is represented by a sector with an angle of 72°.
Brian's weekly income is represented by a sector with an angle of 60°.

(a) Andrew's weekly income was £270.

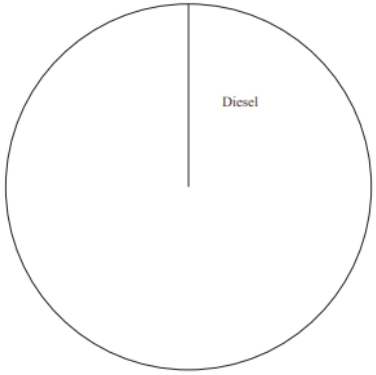
Find the total weekly income of the five employees. **(b)** Calculate Brian's weekly income.

(c) Carol's weekly income was £405.

Calculate the angle of the sector representing Carol's weekly income. Jun2011P2

(b) A service station sells diesel, unleaded and super unleaded fuel.
During one week, 13 500 litres of diesel and 36 000 litres of unleaded were sold.
The total number of litres of fuel sold that week was 54 000.

(i) What fraction of the total number of litres sold was super unleaded?
Give your answer in its lowest terms.



(ii) Complete the pie chart to represent the amounts of fuel sold.

Nov2013P2

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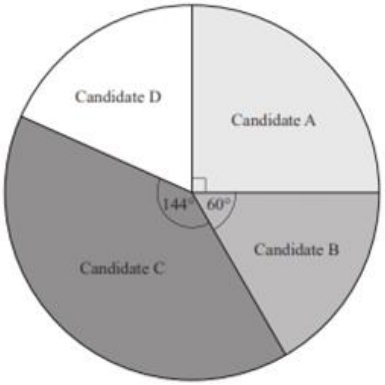
7 **(a)** The pie chart summarises the results of a local election.



(i) Candidate B received 1600 votes.

Work out the total number of people who voted in the election.

(ii) What fraction of the vote did candidate D receive?
Give your answer in its lowest terms.

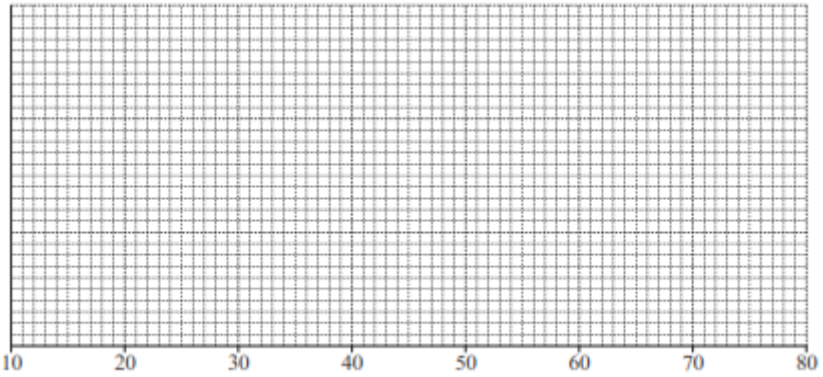
iii) How many more votes than candidate A did candidate C receive?

(b) The table summarises the ages of the members of a film club.

Age (a years)	$15 \leqslant a < 20$	$20 \leqslant a < 30$	$30 \leqslant a < 40$	$40 \leqslant a < 60$	$60 \leqslant a < 80$
Frequency	12	36	45	33	24

(i) Calculate an estimate of the mean age of the members.

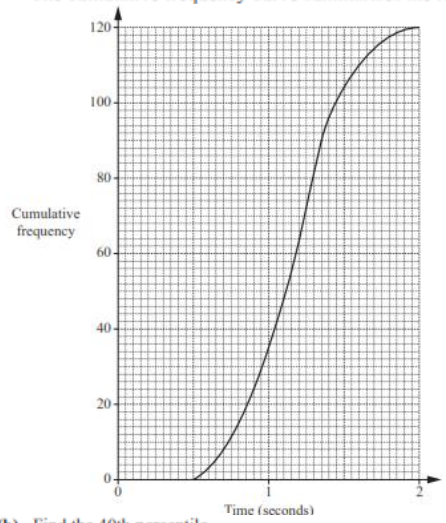
(ii) On the grid below, draw a histogram to represent this data.



(iii) Find an estimate for the number of members of the film club who are over 50.

Cumulative Frequency Curves

14 The times taken by each of 120 runners to react to the starting gun were recorded.
The cumulative frequency curve summarises the results.



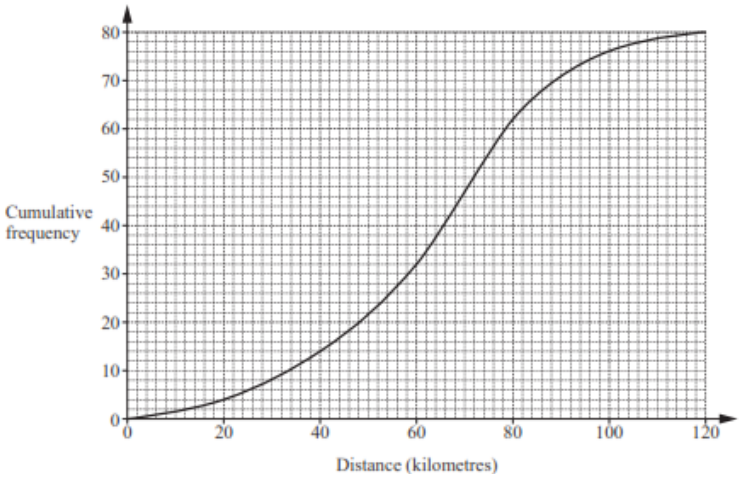
(a) Find the upper quartile.

(b) Find the 40th percentile.

(c) Find the number of students who took less than 1.5 seconds.

Nov2013P1

18 Eighty cyclists were each asked the distance (in kilometres) they cycled last week.



The cumulative frequency diagram represents the results.

Use the graph to estimate

(a) the number of cyclists who cycled between 60 and 80 kilometres,

(b) the median distance cycled,

(c) the interquartile range for the distance cycled.

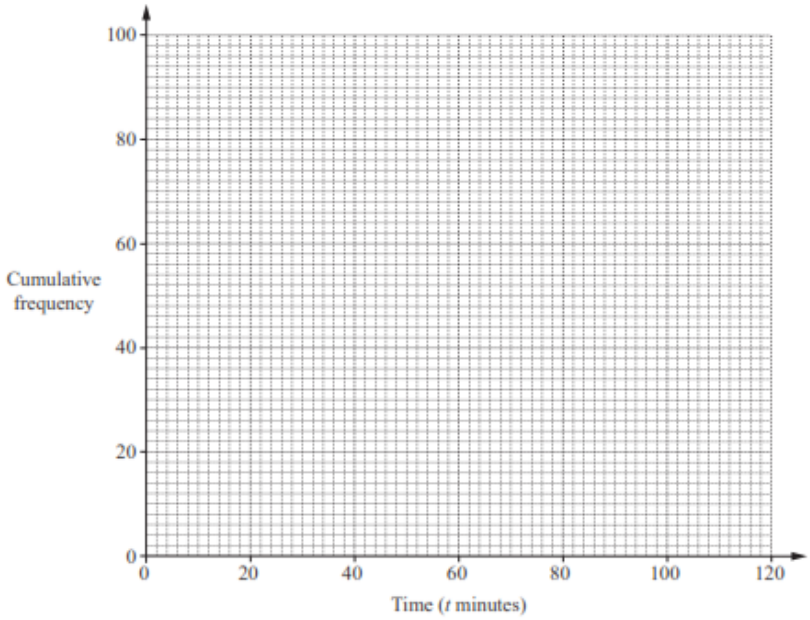
Jun2013P1

22 Each member of a group of 100 people was asked how long they spent at a gym one afternoon.
The results are summarised in the **cumulative** frequency table below.

Time (t mins)	$t \leqslant 20$	$t \leqslant 40$	$t \leqslant 60$	$t \leqslant 90$	$t \leqslant 120$
Cumulative frequency	6	20	46	88	100

(a) How many people spent between 60 and 90 minutes at the gym?

(b) On the grid below, draw the cumulative frequency curve to represent the information in the table.



[2]

(c) Use your cumulative frequency curve to estimate

(i) the median time spent at the gym,

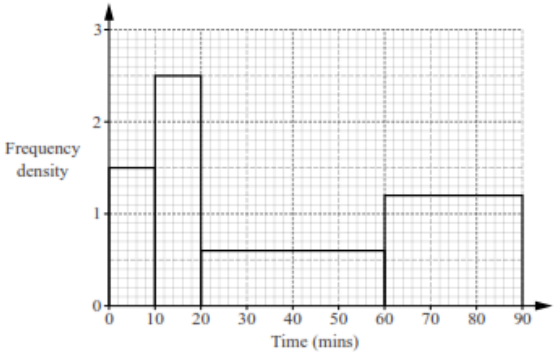
Answer ..... minutes [1]

(ii) the number of people who spent between 50 and 80 minutes at the gym.

Answer ..... [2]

Histograms

21 A group of 100 students was asked how many minutes each spent talking on their mobile phone during one day.
The histogram summarises this information.



(a) Use the histogram to

(I) find the number of students who spent between 0 and 10 minutes talking on their mobile phone,

(II) estimate the number of students who spent between 25 and 65 minutes talking on their mobile phone.

(b) A pie chart is drawn to represent the information shown in the histogram.

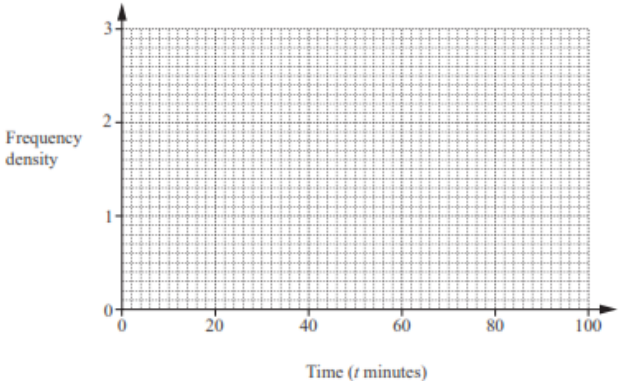
Calculate the angle of the sector that represents the students who spent between 0 and 10 minutes talking on their mobile phone.

Jun2012P1

11 **(a)** 100 students were each asked how long they spent talking on their mobile phone during one day.
The results are summarised in the table.

Time (t minutes)	$0 < t \leqslant 10$	$10 < t \leqslant 20$	$20 < t \leqslant 40$	$40 < t \leqslant 60$	$60 < t \leqslant 80$	$80 < t \leqslant 100$
Frequency	10	30	12	16	20	12

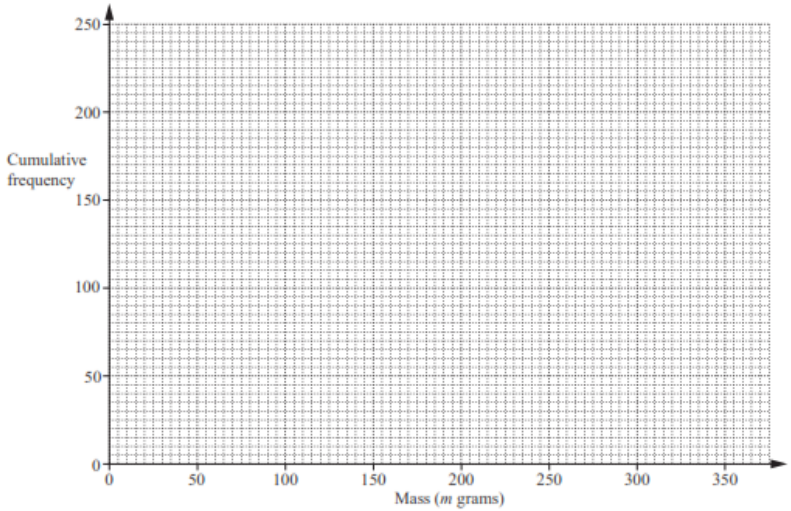
On the axes below, draw a histogram to represent these results.



(b) The masses, in grams, of 240 potatoes were found.
The **cumulative** frequency table for these results is shown below.

Mass (m grams)	$m \leqslant 50$	$m \leqslant 100$	$m \leqslant 150$	$m \leqslant 200$	$m \leqslant 250$	$m \leqslant 300$	$m \leqslant 350$
Cumulative frequency	0	4	54	132	204	236	240

(i) Draw a smooth cumulative frequency curve to illustrate this information.



(ii) **(a)** Find the median.

Answer ..... [1]

(b) Find the inter-quartile range.

(iii) Complete the frequency table below.

Mass (m grams)	$50 < m \leqslant 100$	$100 < m \leqslant 150$	$150 < m \leqslant 200$	$200 < m \leqslant 250$	$250 < m \leqslant 300$	$300 < m \leqslant 350$
Frequency	4					

[1]

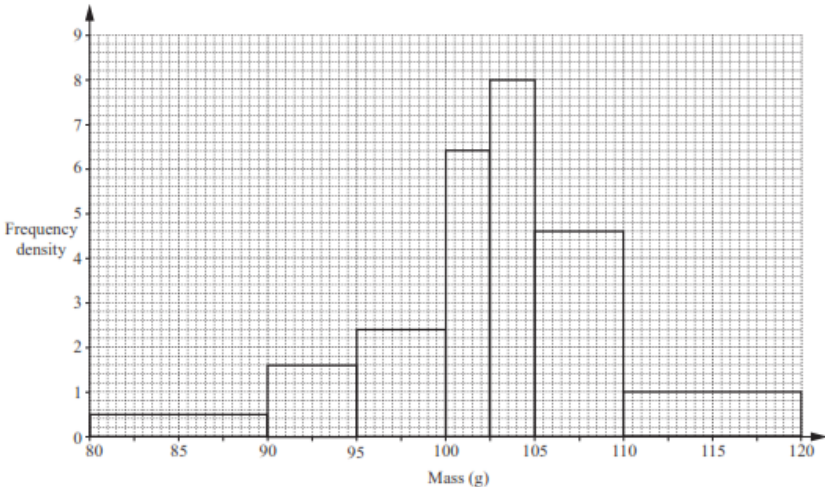
(iv) A potato with a mass greater than 250 grams is classed as extra large.

(a) How many of these potatoes are extra large?

Answer ..... [1]

(b) Which percentile of the distribution can be used to find this number?

4 **(a)** The histogram represents the distribution of the masses, in grams, of individual apples in a box.



This information is summarised in the table below.

Mass (m g)	Frequency
$80 < m \leqslant 90$	5
$90 < m \leqslant 95$	8
$95 < m \leqslant 100$	p
$100 < m \leqslant 102.5$	q
$102.5 < m \leqslant 105$	20
$105 < m \leqslant 110$	23
$110 < m \leqslant 120$	10

Calculate p and q.

(b) The mass of each plum in a box is recorded correct to the nearest 5 grams.

Mass (to the nearest 5 g)	Frequency
10 – 15	6
20 – 25	18
30 – 35	25
40 – 45	10
50 – 55	1

(i) Calculate an estimate of the mean mass of a plum.

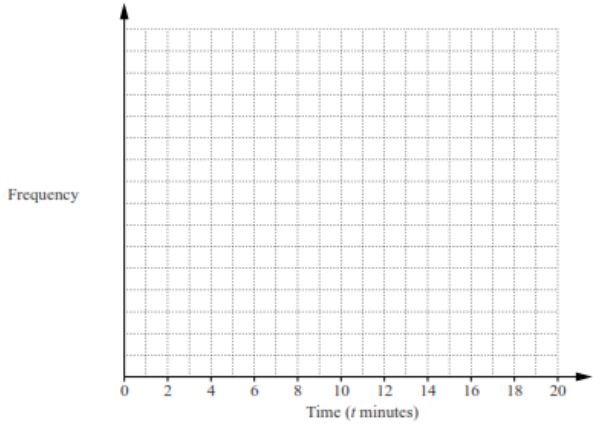
(ii) Calculate the upper bound for the total mass of plums in the box.

Frequency Polygons

23 The table summarises the times, in minutes, taken by a group of people to complete a puzzle.

Time (t minutes)	$0 < t \leqslant 4$	$4 < t \leqslant 8$	$8 < t \leqslant 12$	$12 < t \leqslant 16$	$16 < t \leqslant 20$
Frequency	4	8	7	4	2

(a) On the grid draw a frequency polygon to represent this information.



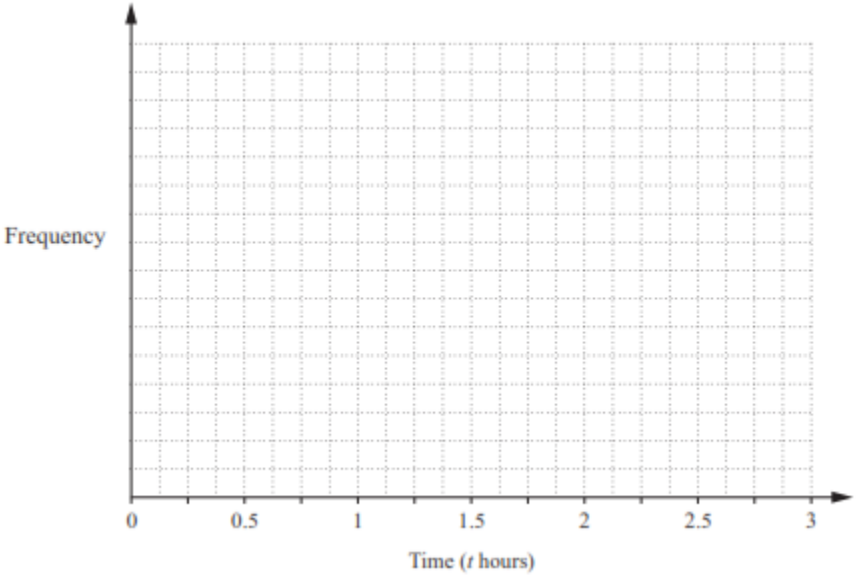
(b) Write down the modal class. **(c)** How many people took more than 8 minutes to complete the puzzle?

Jun2012P1

24 Some students were asked how long they had each spent doing homework the day before. The results are summarised in the table.

Time (t hours)	$0 < t \leqslant 0.5$	$0.5 < t \leqslant 1$	$1 < t \leqslant 1.5$	$1.5 < t \leqslant 2$	$2 < t \leqslant 2.5$	$2.5 < t \leqslant 3$
Girls	0	5	8	6	0	1
Boys	3	3	4	5	3	2

(a) On the grid, draw a frequency polygon to represent this information for the girls and another frequency polygon for the boys.



(b) Write down the modal group for the girls.

Answer ..... [1]

(c) Make a comment comparing the distribution of the times spent by the girls with the times spent by the boys.

Answer

.....

..... [1]

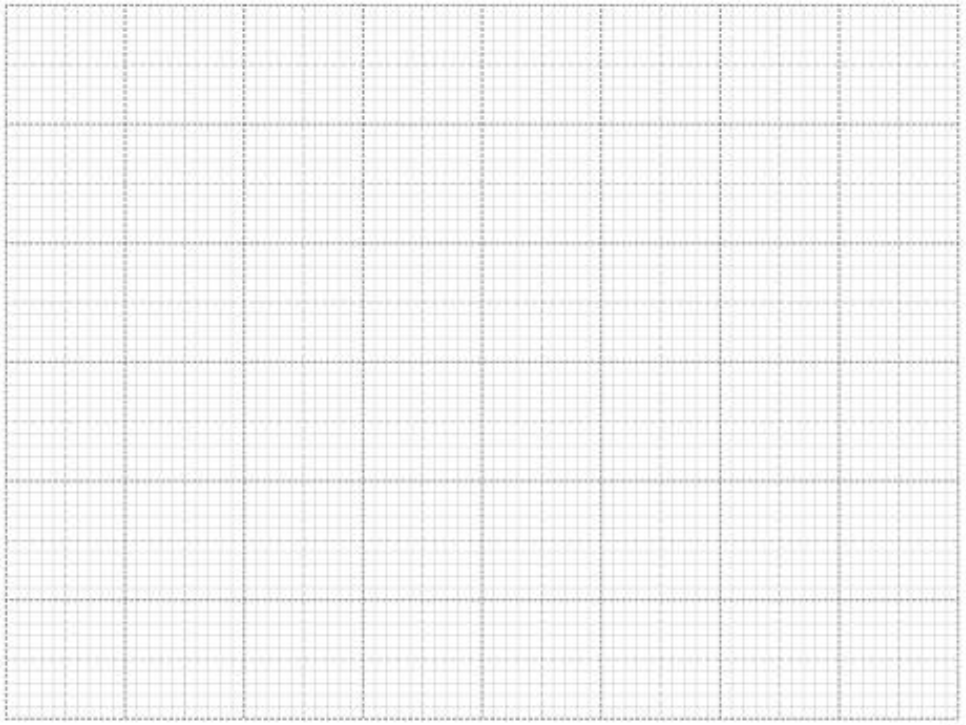
4 The table shows the distribution of the masses of 100 babies at birth.

Mass (x kg)	$1.5 < x \leqslant 2$	$2 < x \leqslant 2.5$	$2.5 < x \leqslant 3$	$3 < x \leqslant 3.5$	$3.5 < x \leqslant 4$	$4 < x \leqslant 4.5$	$4.5 < x \leqslant 5$
Number of babies	3	12	20	24	25	14	2

(a) Write down the modal class.

(b) For this part of the question use the grid below.
Using a scale of 4 cm to represent 1 kg, draw a horizontal x-axis for $1 \leqslant x \leqslant 5$.
Using a scale of 2 cm to represent 5 babies, draw a vertical axis for frequency from 0 to 30.

Using your axes, draw a frequency polygon to represent these results.



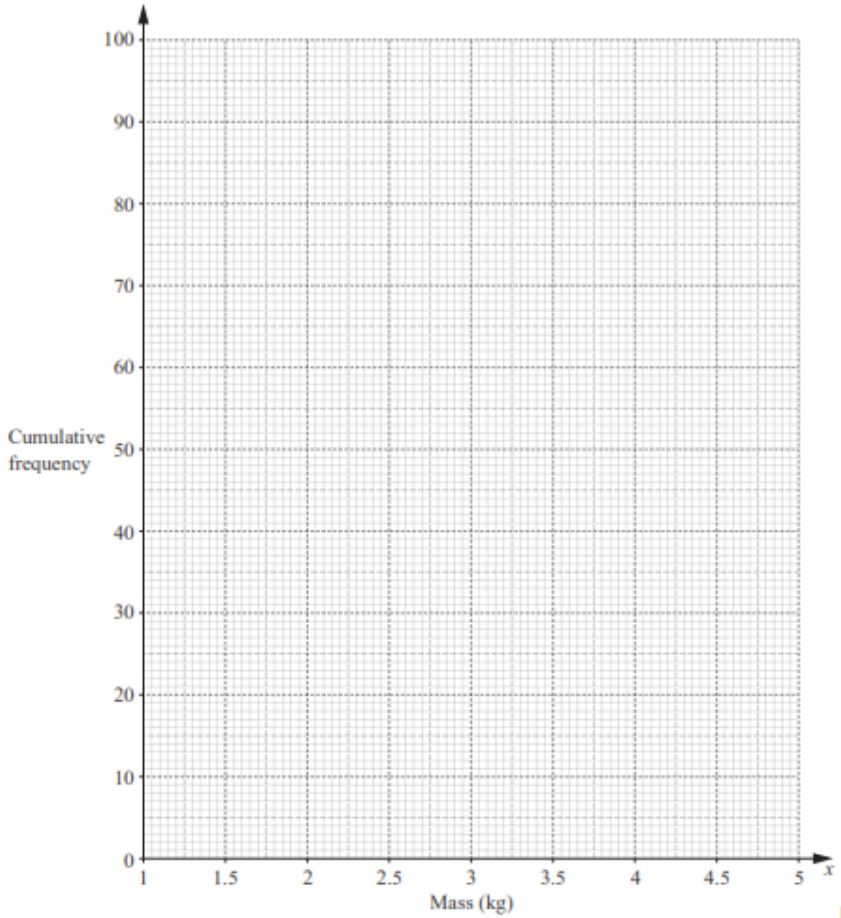
[2]

(c) **(i)** Complete the cumulative frequency table below.

Mass (x kg)	$x \leqslant 2$	$x \leqslant 2.5$	$x \leqslant 3$	$x \leqslant 3.5$	$x \leqslant 4$	$x \leqslant 4.5$	$x \leqslant 5$
Cumulative frequency	3	15					100

[1]

(ii) On the grid below draw a smooth cumulative frequency curve to represent these results.



[2]

(d) Use your curve to estimate

(i) the median mass,

Answer ..... kg [1]

(ii) the 10th percentile.

Answer ..... kg [1]