**GCSE · Edexcel · Maths**

2 hours  36 questions

Exam Questions

# Statistical Diagrams

Stem & Leaf Diagrams / Bar Charts & Pictograms / Pie Charts / Frequency Polygons / Time Series Graphs / Reading & Interpreting Statistical Diagrams / Comparing Statistical Diagrams

| | |
|---|---|
| Easy (15 questions) | /36 |
| Medium (15 questions) | /54 |
| Hard (6 questions) | /24 |
| **Total Marks** | **/114** |

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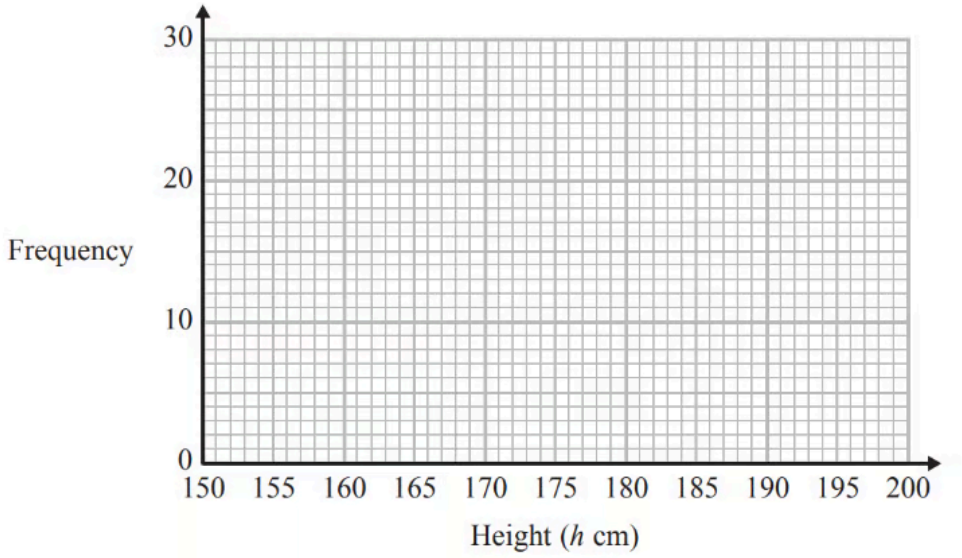
# Easy Questions

**1** The frequency table gives information about the heights of some people.

| Height ($h$ cm) | Frequency |
|---|---|
| $160 < h \leqslant 165$ | 2 |
| $165 < h \leqslant 170$ | 5 |
| $170 < h \leqslant 175$ | 10 |
| $175 < h \leqslant 180$ | 21 |
| $180 < h \leqslant 185$ | 16 |
| $185 < h \leqslant 190$ | 4 |

Draw a frequency polygon for this information.




**(2 marks)**

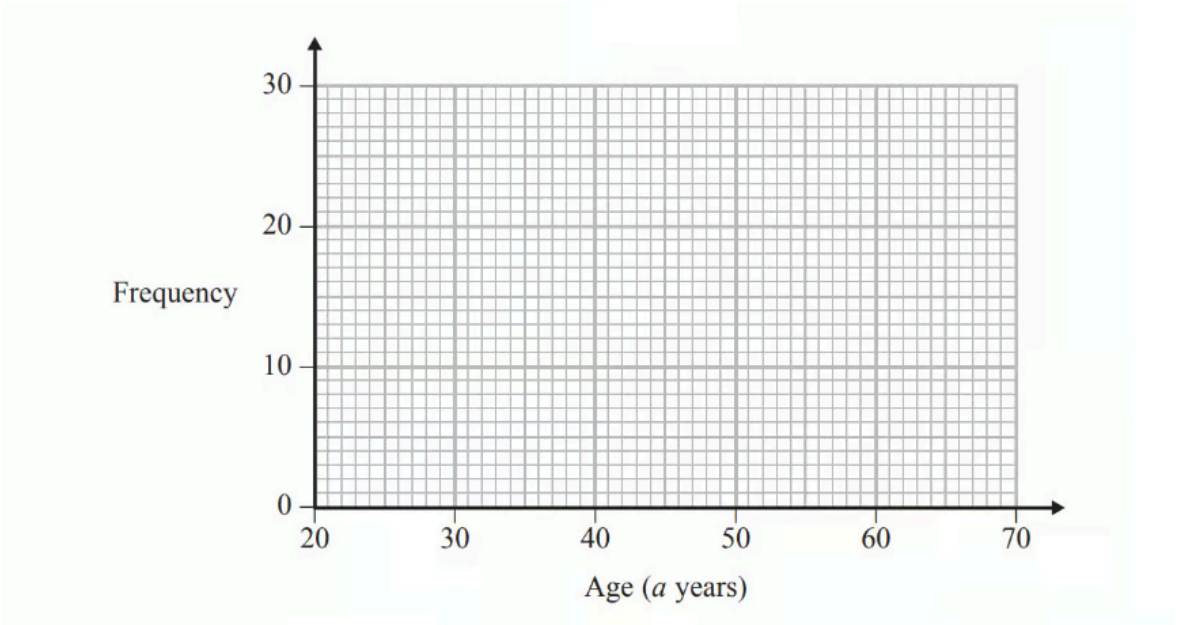
**2 (a)** The table shows some information about the ages of $60$ teachers.

| **Age( $a$ years)** | **Frequency** |
|---|---|
| $20 < a \leqslant 30$ | 6 |
| $30 < a \leqslant 40$ | 16 |
| $40 < a \leqslant 50$ | 14 |
| $50 < a \leqslant 60$ | 22 |
| $60 < a \leqslant 70$ | 2 |

Write down the modal class interval.

**(1 mark)**

**(b)** Draw a frequency polygon for the information in the table.

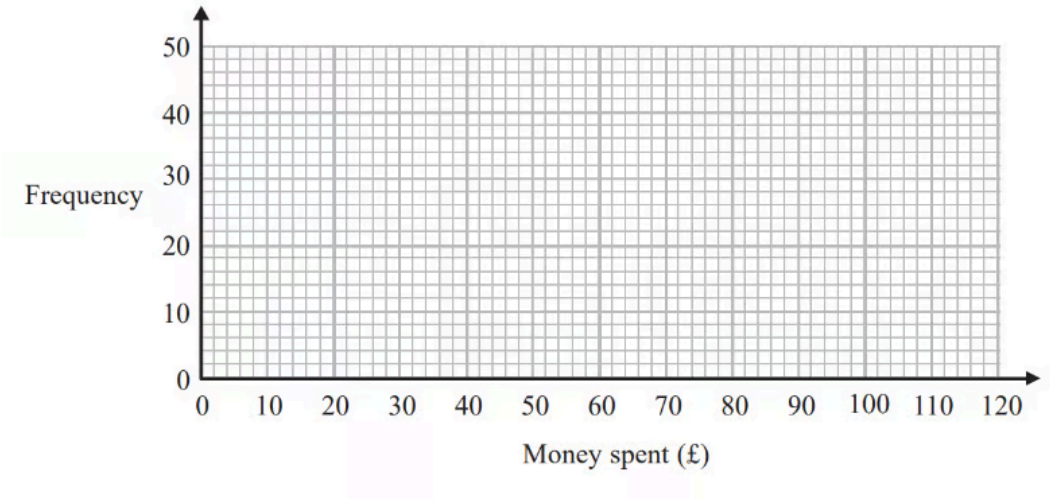



**(2 marks)**

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

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

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




**(2 marks)**

**(b)** Write down the modal class interval.

**(1 mark)**

**4** Here are the times, in minutes, that 20 children took to walk to school.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 13 | 21 | 19 | 27 | 31 | 5 | 23 | 29 | 18 | 25 |
| 34 | 15 | 28 | 23 | 22 | 40 | 16 | 19 | 32 | 9 |

Draw an ordered stem and leaf diagram for these times.

**(3 marks)**

**5** Here are the heights, in cm, of 18 children.

| | | | | | |
|---|---|---|---|---|---|
| 98 | 90 | 84 | 102 | 115 | 91 |
| 88 | 91 | 108 | 110 | 97 | 93 |
| 90 | 89 | 103 | 95 | 92 | 106 |

Show this information in an ordered stem and leaf diagram.

**(3 marks)**

**6** Here are the heights, in mm, of 20 plants.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 53 | 44 | 48 | 56 | 48 | 64 | 51 | 33 | 41 | 44 |
| 31 | 52 | 55 | 63 | 60 | 56 | 47 | 61 | 37 | 56 |

Draw an ordered stem and leaf diagram for these heights.

**(3 marks)**

**7** Sixteen babies are born in a hospital.

Here are the weights of the babies in kilograms.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2.4 | 2.7 | 3.5 | 4.4 | 4.5 | 4.1 | 4.4 | 2.8 |
| 4.1 | 3.8 | 3.8 | 4.2 | 3.3 | 3.0 | 3.7 | 3.3 |

Show this information in an ordered stem and leaf diagram.

**(3 marks)**

**8** Here are the ages, in years, of 15 students.

| | | | | |
|---|---|---|---|---|
| 19 | 18 | 20 | 25 | 37 |
| 33 | 21 | 17 | 29 | 20 |
| 42 | 18 | 23 | 37 | 22 |

Show this information in an ordered stem and leaf diagram.

**(3 marks)**

**9** Here are the speeds, in miles per hour, of 16 cars.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 31 | 52 | 43 | 49 | 36 | 35 | 33 | 29 |
| 54 | 43 | 44 | 46 | 42 | 39 | 55 | 48 |

Draw an ordered stem and leaf diagram for these speeds.

**(3 marks)**

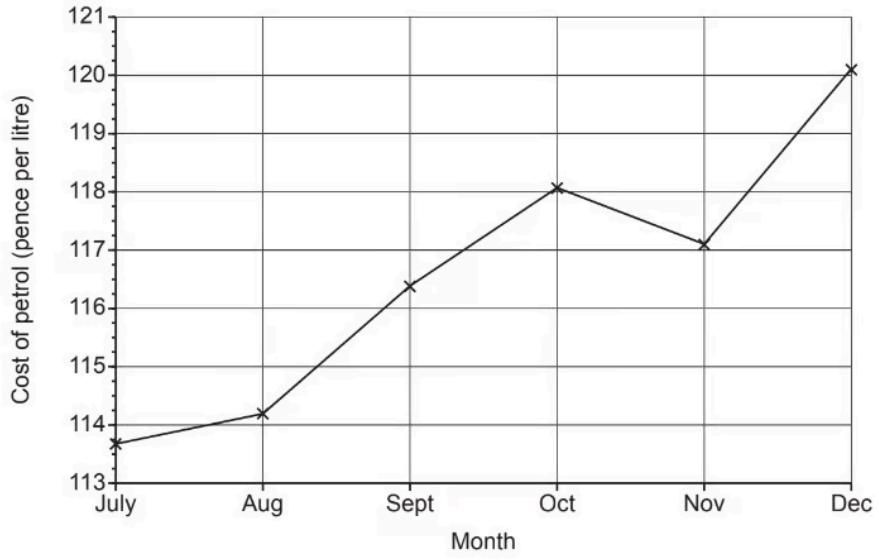
**10** Here are the lengths, in cm, of 15 tables.

| | | | | |
|---|---|---|---|---|
| 28 | 51 | 42 | 23 | 63 |
| 38 | 44 | 29 | 32 | 37 |
| 61 | 35 | 39 | 41 | 25 |

Draw an ordered stem and leaf diagram for these lengths.

**(3 marks)**

**11** The graph shows the cost of a litre of petrol for the last six months of 2017.

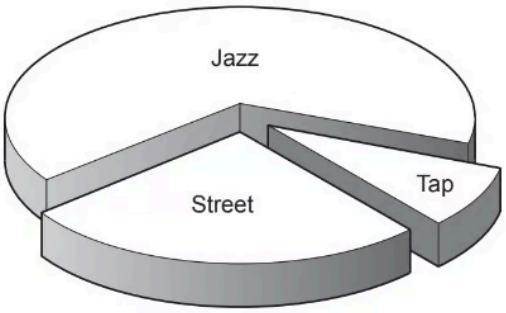



Explain why this graph is misleading.

**(1 mark)**

**12** This chart shows the types of dance performed by 12 dancers.

3 performed a street dance, 8 performed a jazz dance and 1 performed a tap dance.

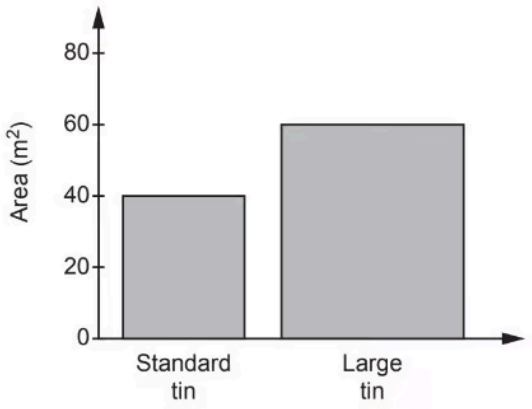



Why is this diagram misleading?

**(1 mark)**

**13** Percy sells paint in standard tins and large tins.
The standard tin covers $40m^2$ and the large tin covers $60m^2$.

Percy publishes this chart showing the area that can be covered with each tin of paint.

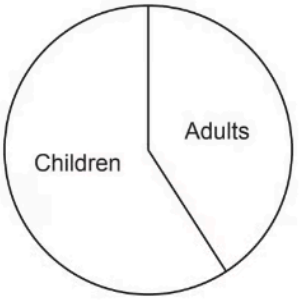



Explain why the chart is misleading.

**(1 mark)**

**14** The pie chart summarises information about the visitors to the tourist attraction on a

single day.




Explain why the pie chart cannot be used to work out how many adults visited on that day.

**(1 mark)**

**15** There are only apple trees, cherry trees, pear trees and plum trees in an orchard.

The pictogram shows information about the numbers of apple trees, cherry trees and pear trees in the orchard.

| | |
|---|---|
| Apple | ☐ ☐ ☐ |
| Cherry | ☐ ▯ |
| Pear | ☐ ▯ |
| Plum | |

**Key:**

☐ represents 4 trees

There is a total of 30 trees in the orchard.

Complete the pictogram.

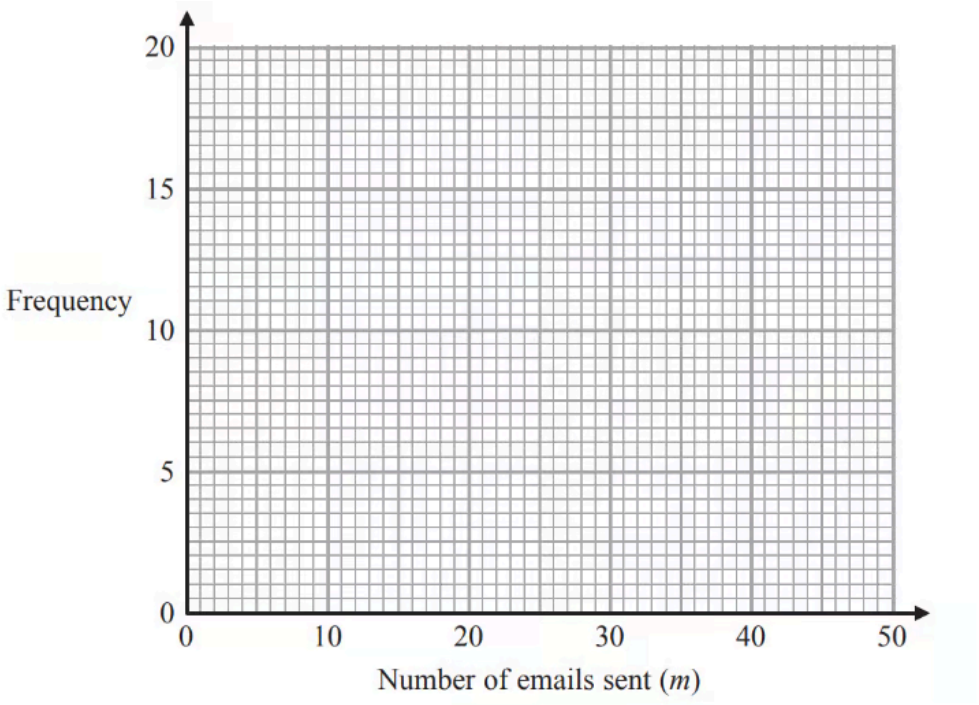
**(3 marks)**

# Medium Questions

**1 (a)** The frequency table gives information about the numbers of emails sent by $51$ teachers on Monday.

| Number of emails sent($m$) | Frequency |
|---|---|
| $0 < m \leqslant 10$ | 5 |
| $10 < m \leqslant 20$ | 17 |
| $20 < m \leqslant 30$ | 14 |
| $30 < m \leqslant 40$ | 9 |
| $40 < m \leqslant 50$ | 6 |

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




**(2 marks)**

**(b)** Nalini says that at least a quarter of these teachers sent more than $30$ emails.

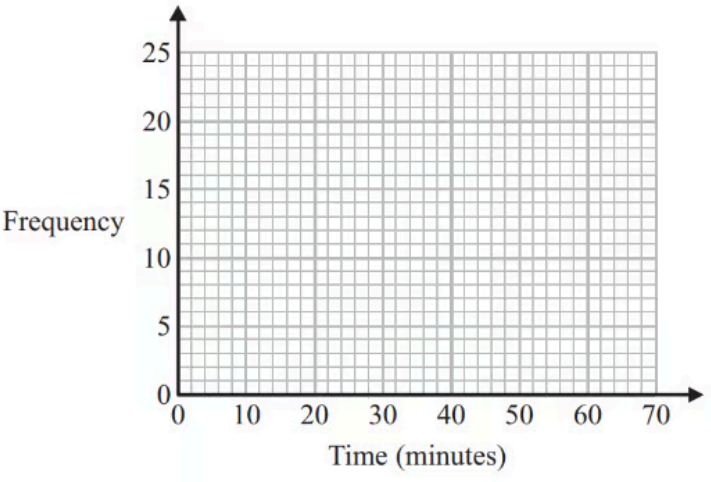
Is Nalini correct?
You must explain your answer.

**(2 marks)**

**2 (a)** 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 |

Draw a frequency polygon for this information.




**(2 marks)**

**(b)** Write down the modal class interval.

**(1 mark)**

**(c)** One of the office workers is chosen at random.

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

**(2 marks)**

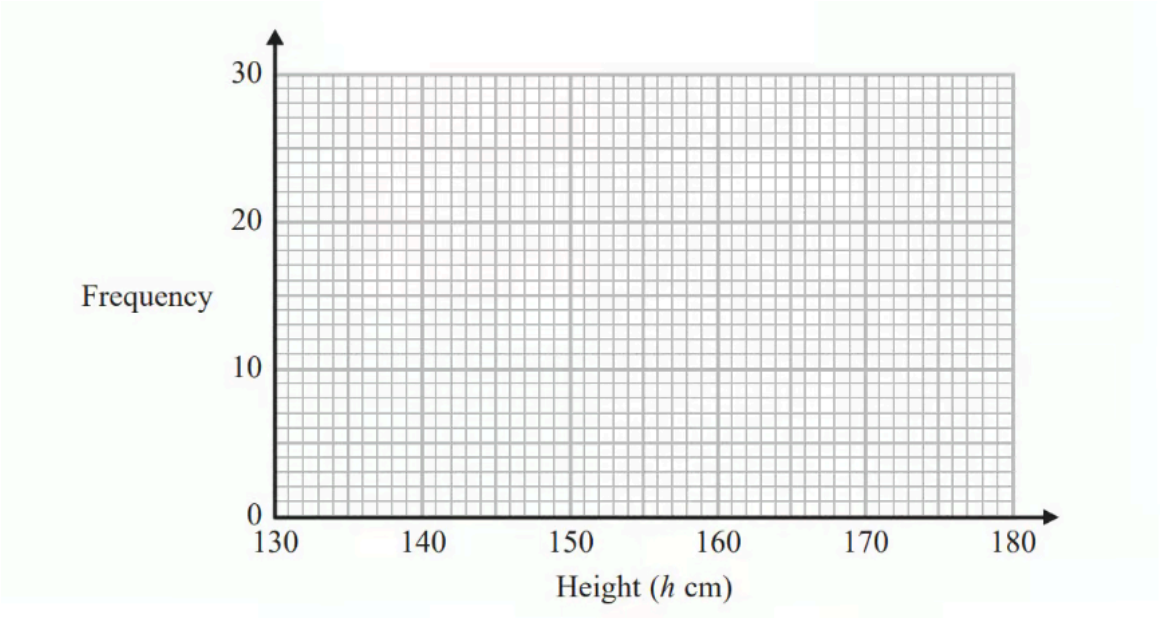
**3 (a)** The table shows information about the heights of $80$ children.

| Height( $h$ cm) | Frequency |
|---|---|
| $130 < h \leqslant 140$ | 4 |
| $140 < h \leqslant 150$ | 11 |
| $150 < h \leqslant 160$ | 24 |
| $160 < h \leqslant 170$ | 22 |
| $170 < h \leqslant 180$ | 19 |

Find the class interval that contains the median.

**(1 mark)**

**(b)** Draw a frequency polygon for the information in the table.



**(2 marks)**

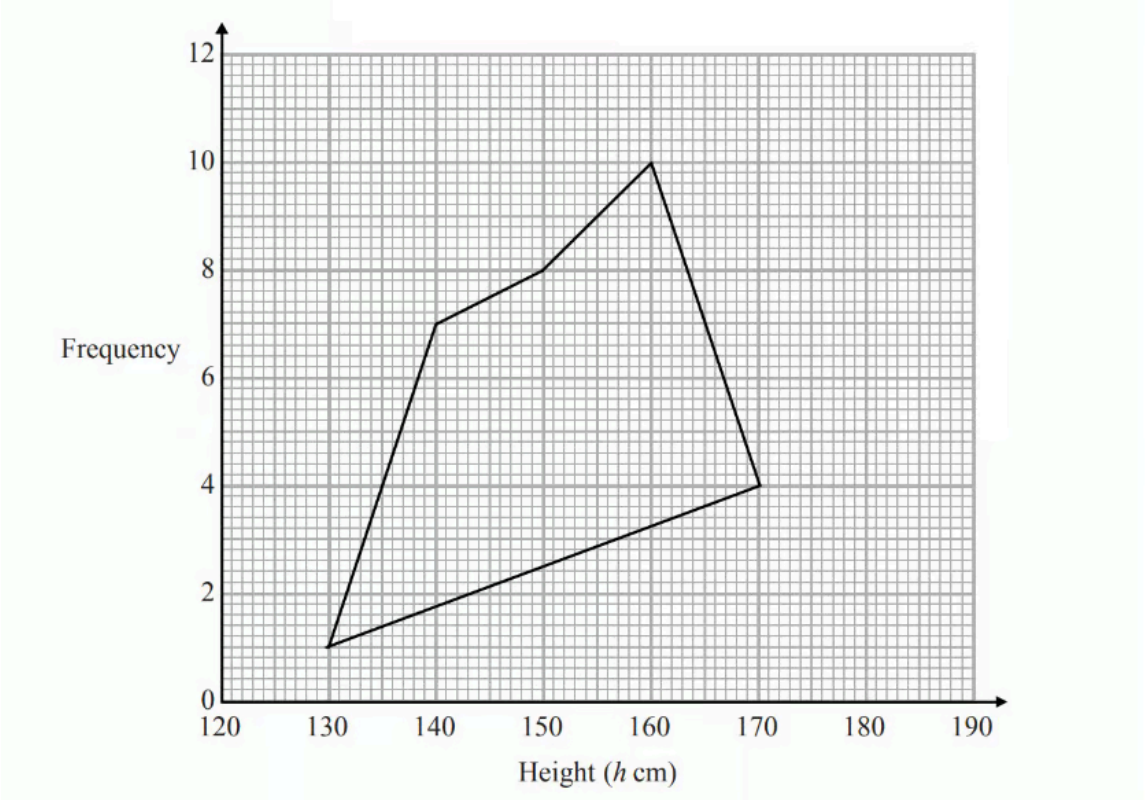
**4 (a)** The grouped frequency table gives information about the heights of $30$ students.

| Height( $h$ cm) | Frequency |
|---|---|
| $130 < h \leqslant 140$ | 1 |
| $140 < h \leqslant 150$ | 7 |
| $150 < h \leqslant 160$ | 8 |
| $160 < h \leqslant 170$ | 10 |
| $170 < h \leqslant 180$ | 4 |

Write down the modal class interval.

**(1 mark)**

**(b)** This incorrect frequency polygon has been drawn for the information in the table.




Write down two things wrong with this incorrect frequency polygon.

**(2 marks)**

**5 (a)** Here are the heights in centimetres of 20 men.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 165 | 164 | 176 | 179 | 188 | 178 | 183 | 172 | 180 | 190 |
| 167 | 159 | 156 | 176 | 173 | 168 | 169 | 182 | 167 | 192 |

Show this information in an ordered stem and leaf diagram.

**(3 marks)**

**(b)** Work out the percentage of these men with a height greater than 184 cm.

**(2 marks)**

**6 (a)** 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 |

Show this information in an ordered stem and leaf diagram.

**(3 marks)**

**(b)** One of these students is going to be chosen at random.

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

**(2 marks)**

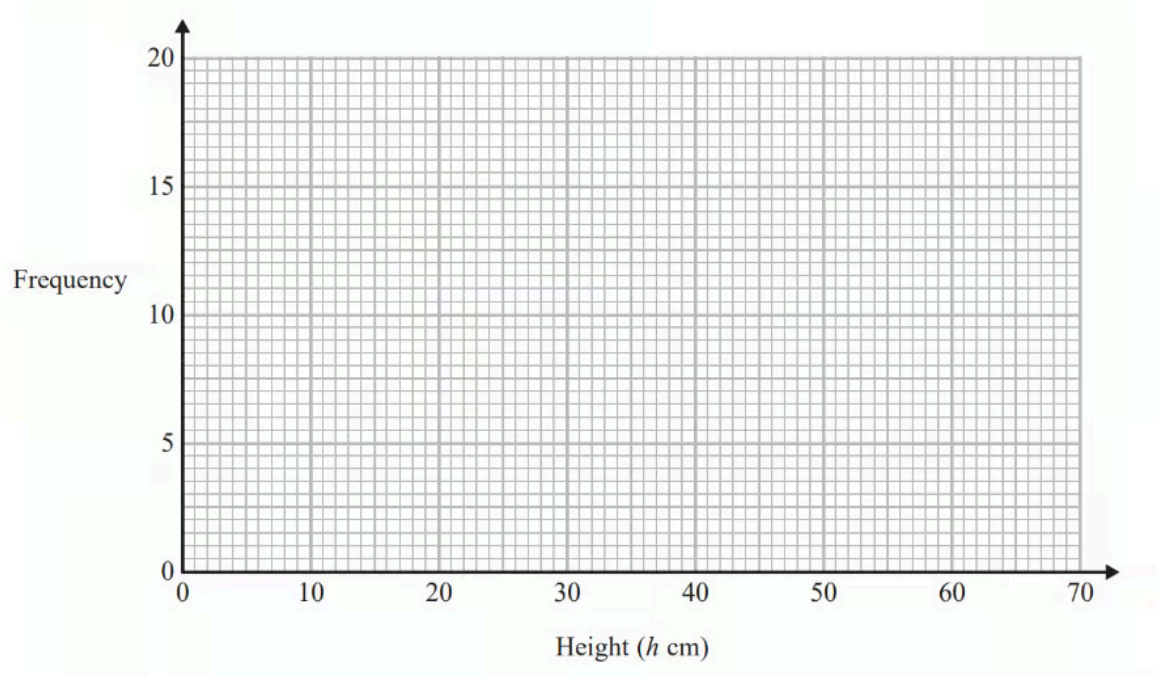
**7 (a)** The table shows information about the heights of $80$ plants.

| Height( $h$ cm) | Frequency |
|---|---|
| $10 < h \leqslant 20$ | 7 |
| $20 < h \leqslant 30$ | 13 |
| $30 < h \leqslant 40$ | 14 |
| $40 < h \leqslant 50$ | 12 |
| $50 < h \leqslant 60$ | 16 |
| $60 < h \leqslant 70$ | 18 |

Find the class interval that contains the median.

**(1 mark)**

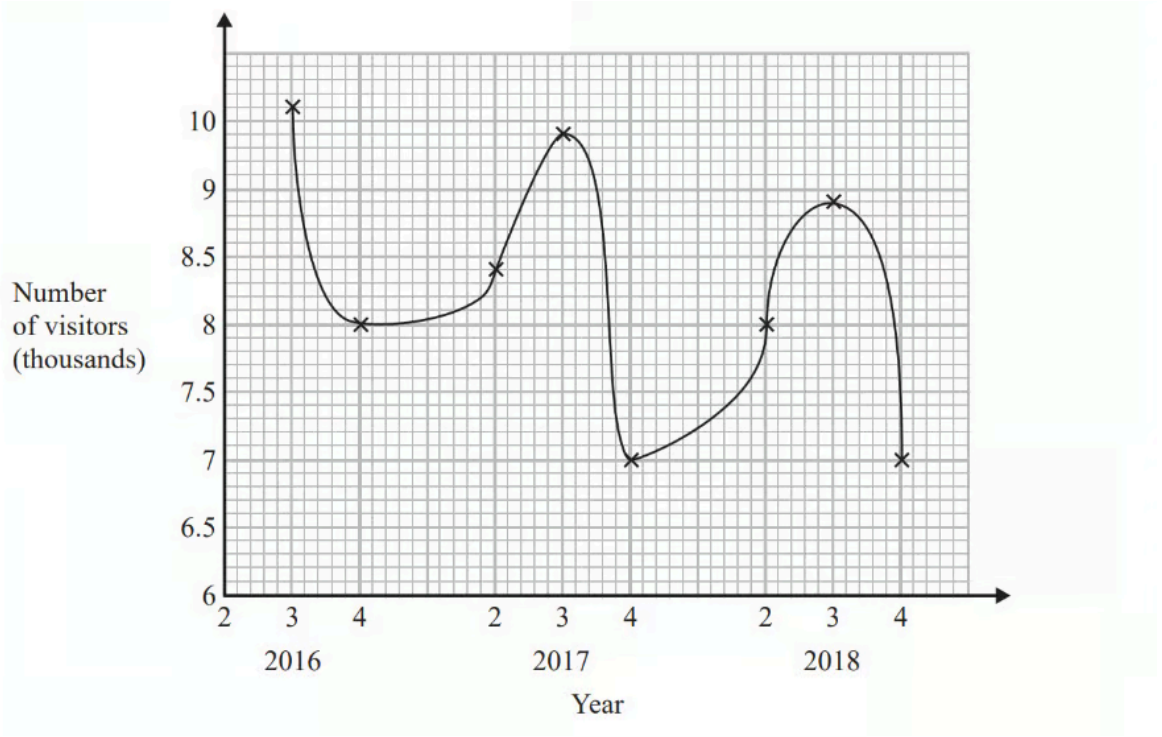
**(b)** On the grid, draw a frequency polygon for the information in the table.




**(2 marks)**

**8** Sean has drawn a time series graph to show the numbers, in thousands, of visitors to a

fun park.

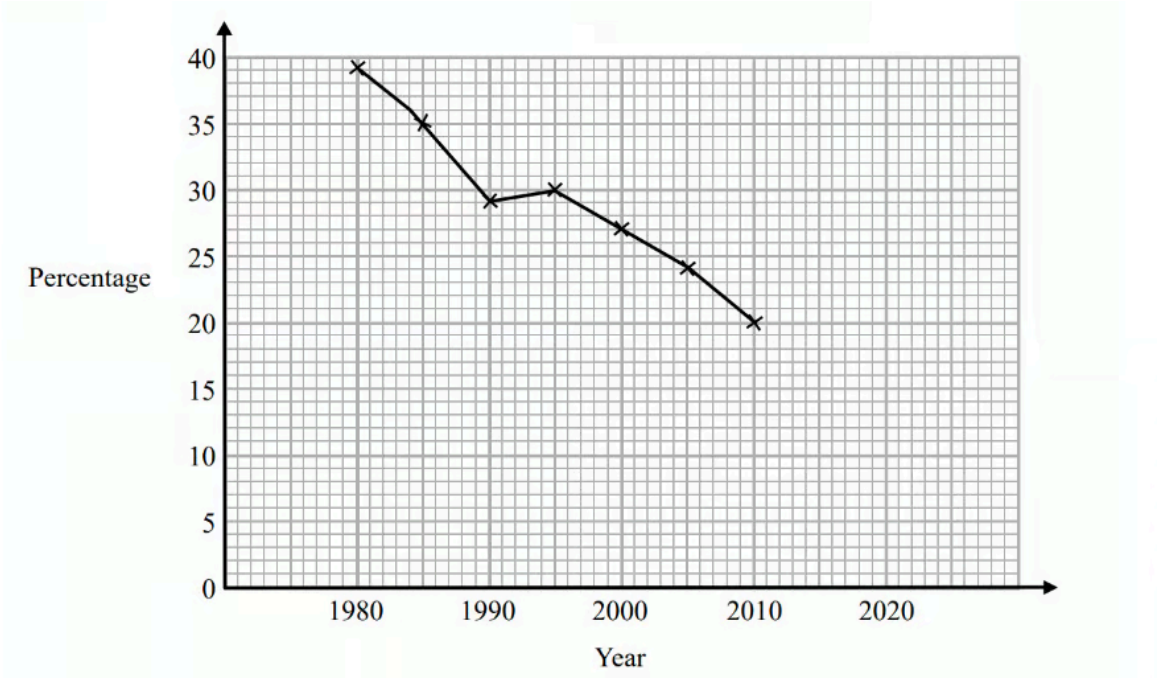



Write down two things that are wrong or could be misleading with this graph.

**(2 marks)**

**9 (a)** The time series graph shows information about the percentages of the people in a village

that used the village shop for the years between 1980 and 2010.




Describe the trend in the percentage of the people in the village who used the shop for this period.

**(1 mark)**

**(b)** i) Use the graph to predict the percentage of the people in the village likely to use the shop in the year 2020.

[1]

ii) Is your prediction reliable?
Explain your answer.

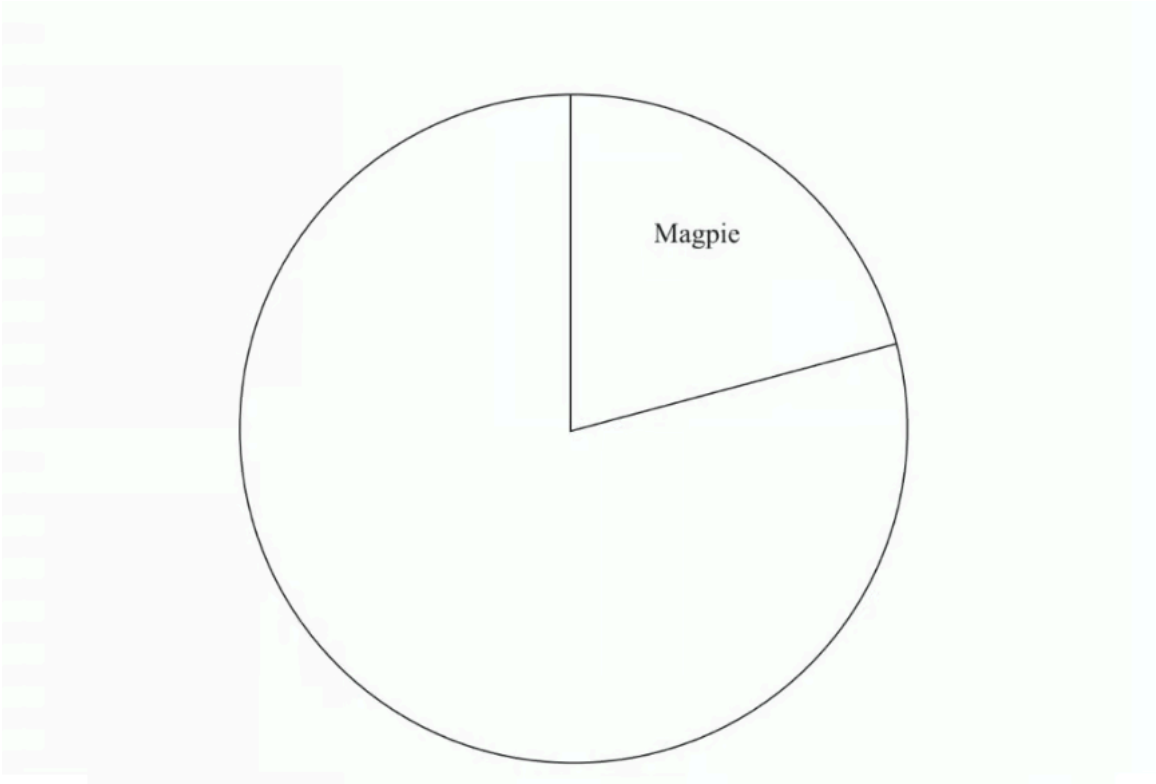
[1]

**(2 marks)**

**10** The table gives some information about the birds Paula sees in her garden one day.

| Bird | Frequency |
|---|---|
| Magpie | 15 |
| Thrush | 10 |
| Startling | 20 |
| Sparrow | 27 |

Complete the accurate pie chart.



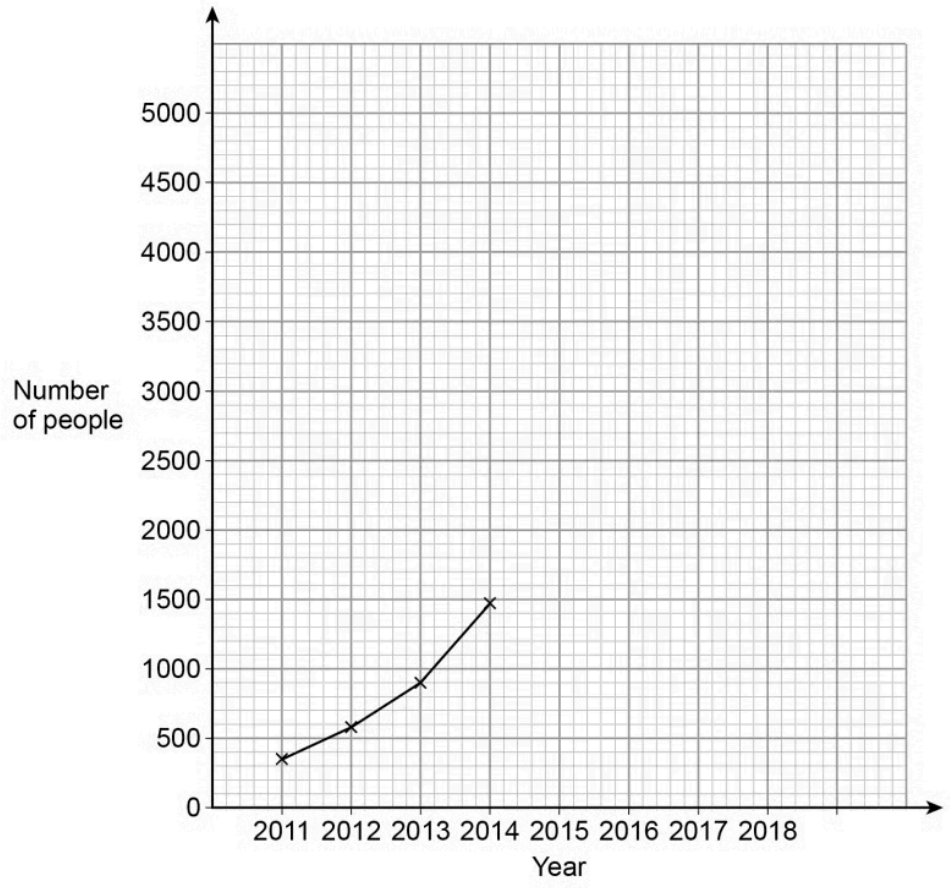

**(3 marks)**

**11 (a)** A music festival has taken place each year from 2011

The table shows the number of people who attended each year.

| Year | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|
| Number of people | 350 | 583 | 906 | 1471 | 2023 | 2612 | 3251 | 3780 |

The festival organisers draw a time series graph to represent the data.
The first four years have been plotted.



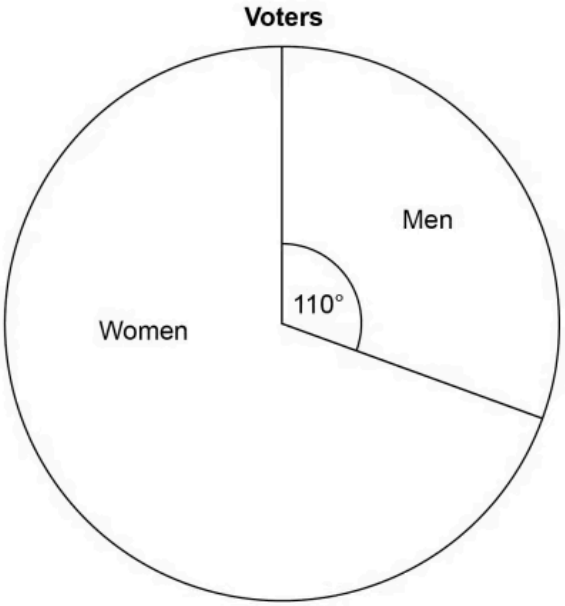

Complete the graph.

**(2 marks)**

**(b)** Use the graph to estimate the number of people who will attend the festival in 2019.

**(2 marks)**

**12** The pie chart shows information about voters in an election.




3360 **more** women voted than men.

Work out the total number of voters.

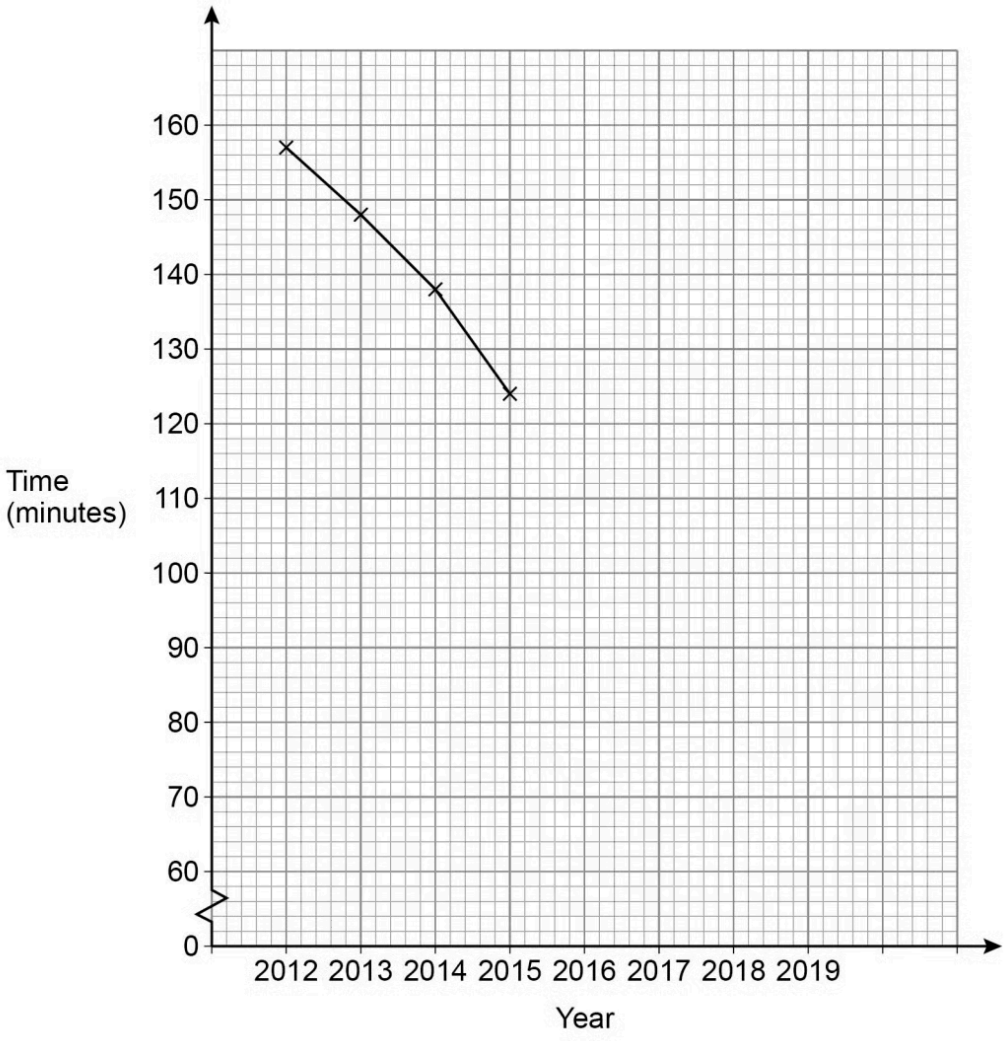
**(3 marks)**

**13 (a)** The time students spent watching TV was recorded.

The table shows the average daily time per student each year from 2012 to 2019

| Year | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|---|---|
| Time (minutes) | 157 | 148 | 138 | 124 | 113 | 100 | 90 | 82 |

A time series graph is drawn to represent the data.
The first four points have been plotted.




Complete the graph.

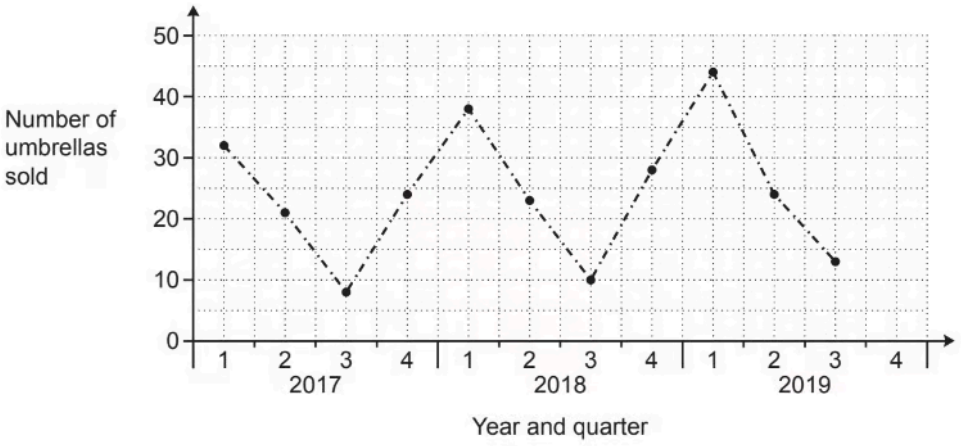
**(2 marks)**

**(b)** Use the graph to estimate the average daily time per student in 2020

..... minutes

**(1 mark)**

**14 (a)** The graph shows the number of umbrellas sold in Ling's shop for each quarter from quarter 1 of 2017 to quarter 3 of 2019.




The shop sold 32 umbrellas in quarter 4 of 2019.
Complete the graph.

**(1 mark)**

**(b)** Make one comment about the **seasonal** variation shown in this graph.

**(1 mark)**

**(c)** Make one comment about the annual variation shown in this graph.

**(1 mark)**

**(d)** Ling predicts that she will sell 50 umbrellas in quarter 1 of 2020.

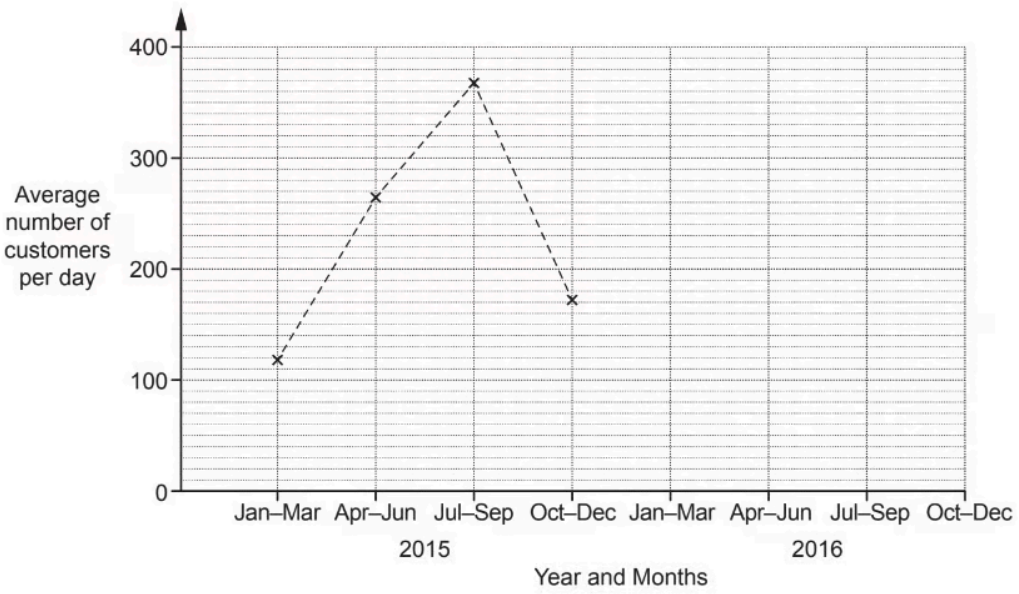
What assumption has she made?

**(1 mark)**

**15 (a)** The table shows the average number of customers per day entering a shop.

| | 2015 | | | | 2016 | | | |
|---|---|---|---|---|---|---|---|---|
| Months | Jan-Mar | Apr-Jun | July-Sep | Oct-Dec | Jan-Mar | Apr-Jun | July-Sep | Oct-Dec |
| Average number of customers per day | 119 | 264 | 368 | 172 | 130 | 304 | 381 | 192 |

Complete the time series graph below.



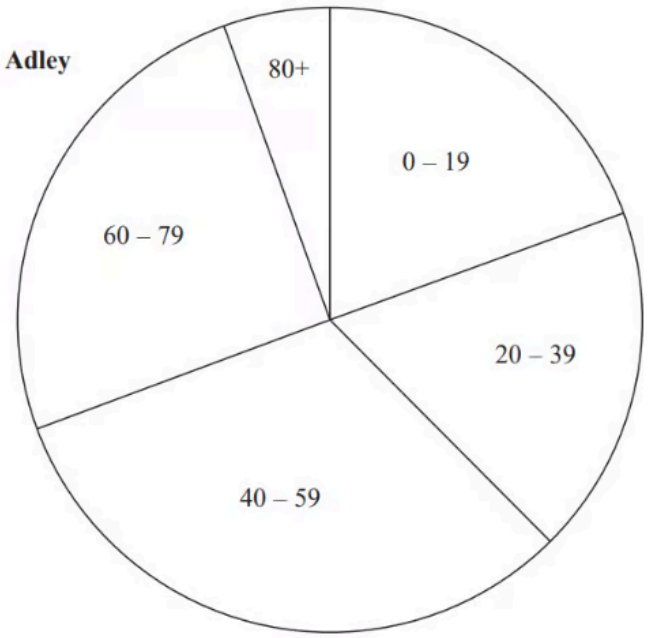

**(2 marks)**

**(b)** Make two different comments comparing the number of customers entering the shop in 2015 and 2016.

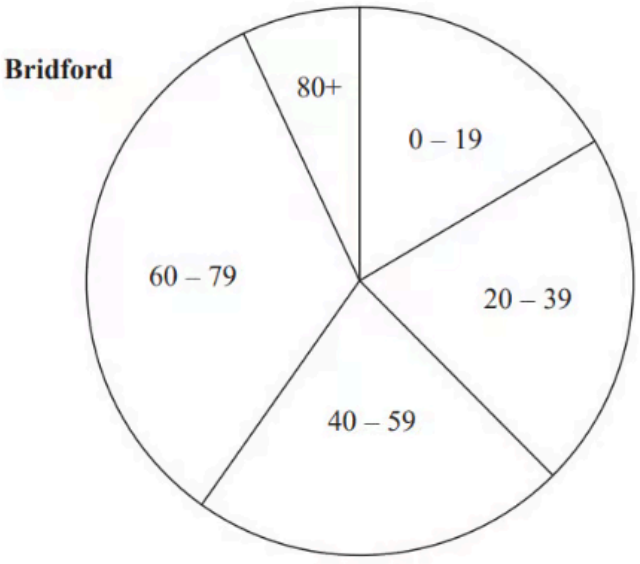
**(2 marks)**

# Hard Questions

**1** The pie charts give information about the ages, in years, of people living in two towns, Adley and Bridford.




Diagrams accurately drawn

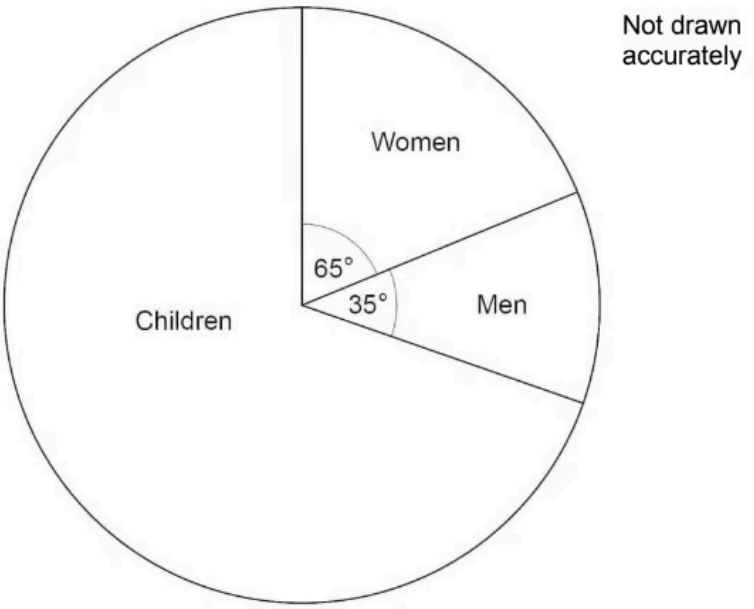



The ratio of the number of people living in Adley to the number of people living in Bridford is given by the ratio of the areas of the pie charts.

What proportion of the total number of people living in these two towns live in Adley **and** are aged 0 -19?
Give your answer correct to 3 significant figures.

**(3 marks)**

**2** The pie chart shows information about people at a theme park.



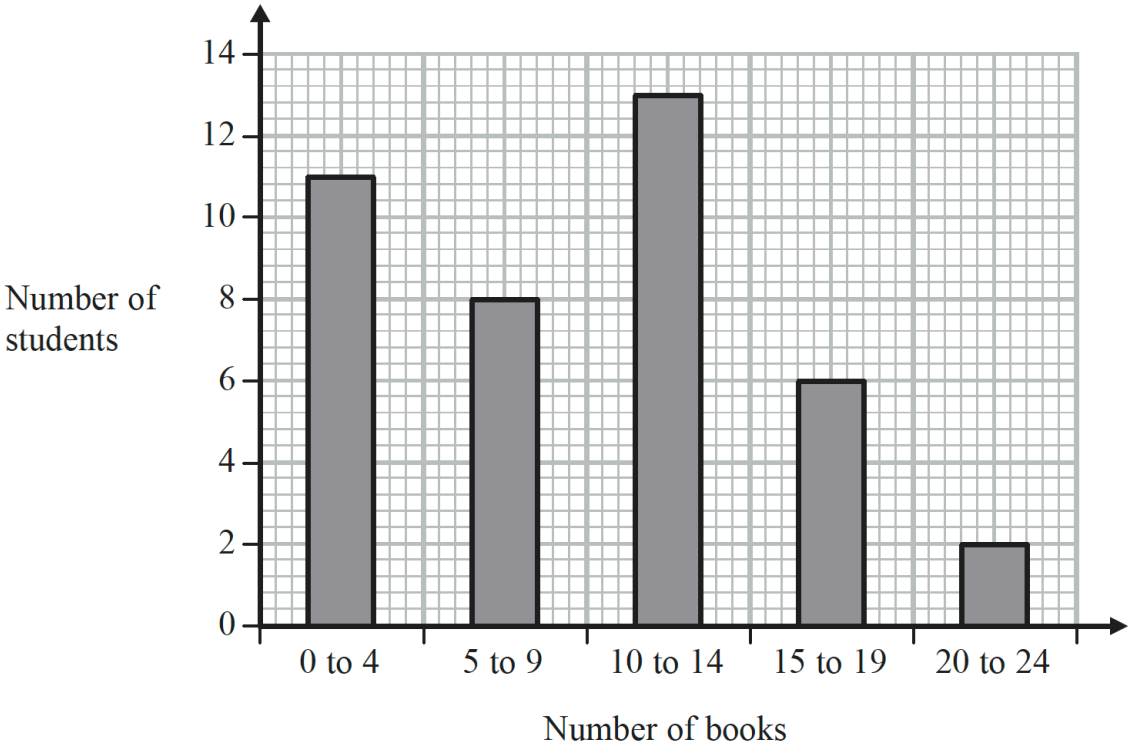

There were 450 more women than men.

Work out the number of children.

**(3 marks)**

**3 (a)** Fran asks each of 40 students how many books they bought last year.

The chart below shows information about the number of books bought by each of the 40 students.




Work out the percentage of these students who bought 20 or more books.

.....%

**(2 marks)**

**(b)** Show that an estimate for the mean number of books bought is 9.5
You must show all your working.

**(1 mark)**

**4** The table shows information about the heights, in cm, of a group of Year 9 girls.

| | |
|---|---|
| least height | 150 cm |
| median | 165 cm |
| greatest height | 170 cm |

This stem and leaf diagram shows information about the heights, in cm, of a group of 15 Year 9 boys.

| | |
|---|---|
| 15 | 8 9 9 |
| 16 | 4 5 7 7 8 |
| 17 | 0 3 4 4 7 |
| 18 | 0 2 |

Key: 15 | 8 represents 158 cm

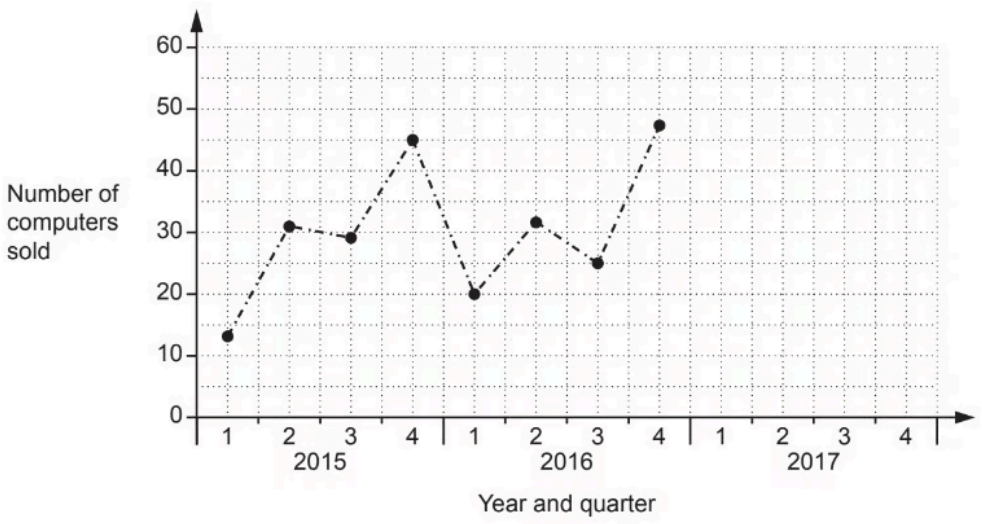
Compare the distribution of the heights of the girls with the distribution of the heights of the boys.

**(3 marks)**

**5 (a)** The table shows the number of computers sold in Tom's shop each quarter from 2015 to 2017.

| | 2015 | | | | 2016 | | | | 2017 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Quarter** | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| **Number of computers sold** | 13 | 31 | 29 | 45 | 20 | 32 | 25 | 47 | 27 | 40 | 30 | 58 |

Complete this graph using the information for 2017.




**(2 marks)**

**(b)** Tom adds the three results for quarter 1 and he adds the three results for quarter 4.
Tom says

The ratio of the **total** number of computers sold in quarter 1 compared to quarter 4 is 2 : 5.

Is he correct?
Show your reasoning.

**(2 marks)**

**(c)** Make two comments about Tom's sales over the period 2015 to 2017.

**(2 marks)**

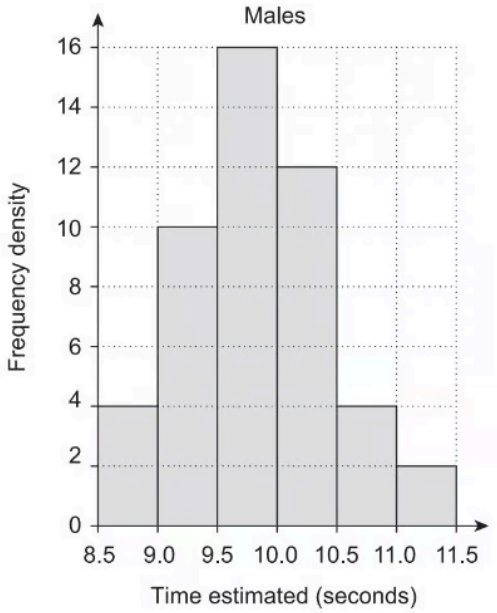
**(d)** Tom predicts that he will sell more than 60 computers in the 4th quarter of 2018.

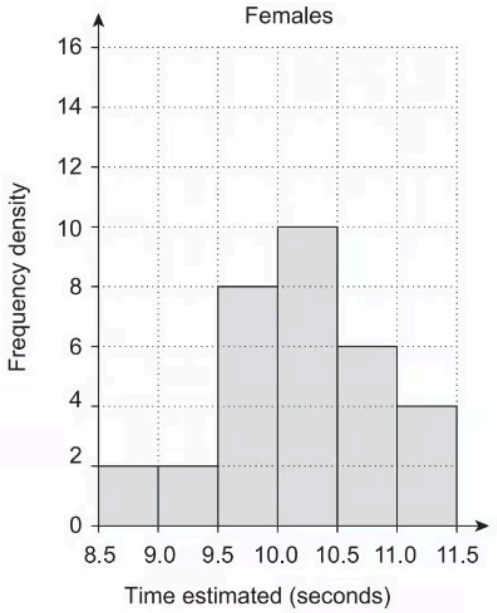
What assumption has he made?

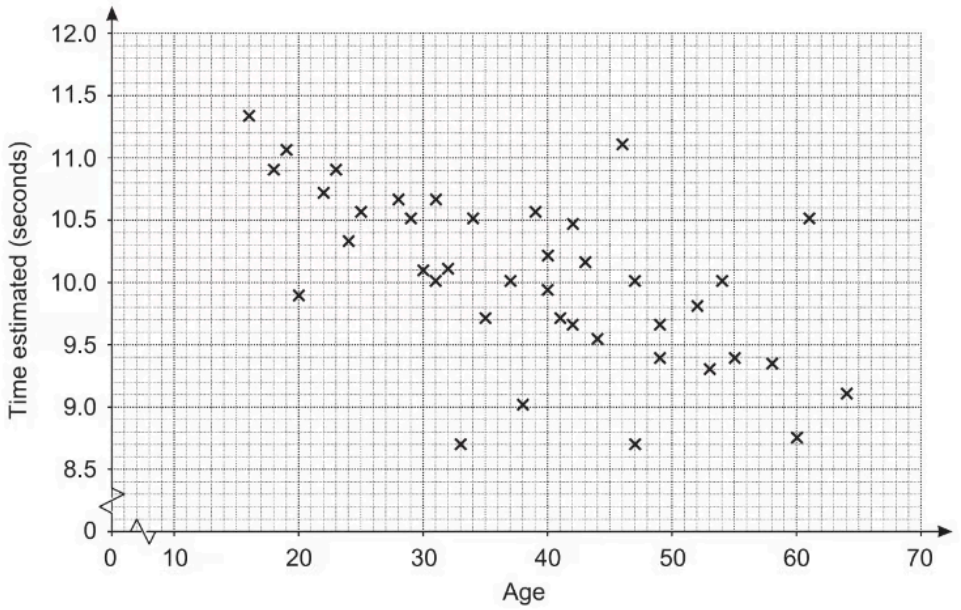
**(1 mark)**

**6 (a)** John wants to investigate whether men in the UK are better at estimating a time interval of 10 seconds than women in the UK. He decides to sample the population by asking his work colleagues to take the test.

The diagrams below summarise John's results.




What information from the diagrams can be used to support each of these statements?

i) The older John's colleagues are, the lower their estimate is.

[1]

ii) Males in the sample tend to underestimate the interval and females in the sample tend to overestimate the interval.

[2]

**(3 marks)**

**(b)** Comment on whether any conclusions can be drawn for the UK population from the results of this sample.

**(2 marks)**