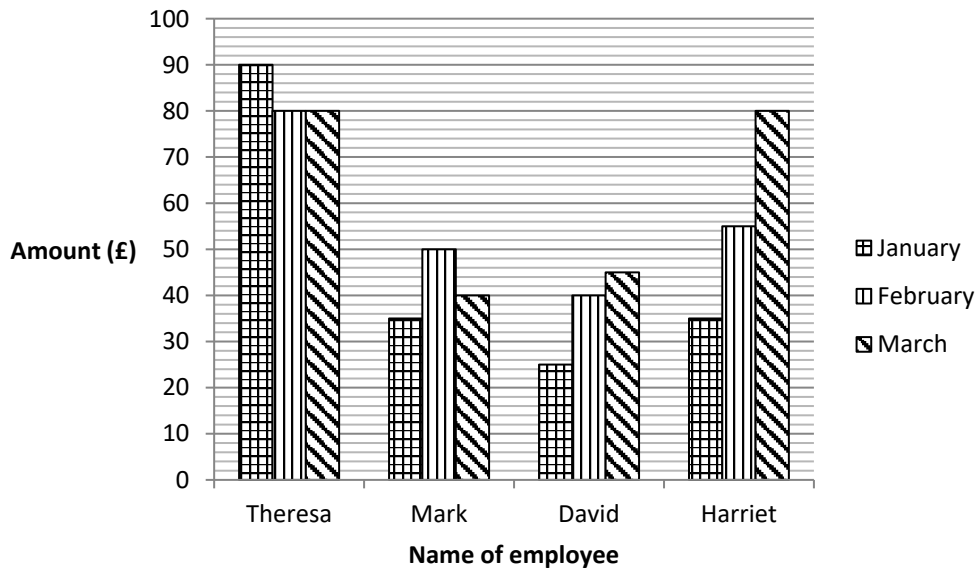


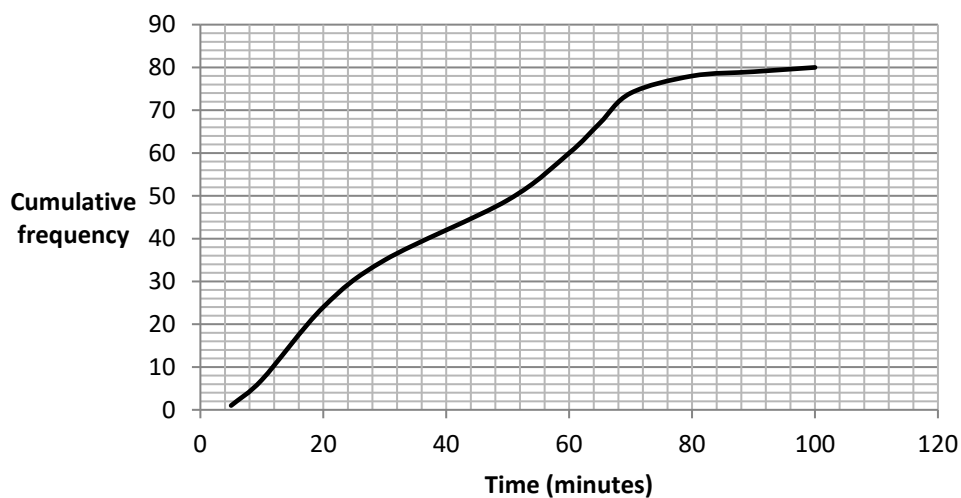
## OCR 12 Statistics (Higher)

- As a car increases its speed, the length of time taken to reach the final destination decreases. State this type of correlation.
- The multiple bar chart represents the amount of expenses claimed by four employees in three months.



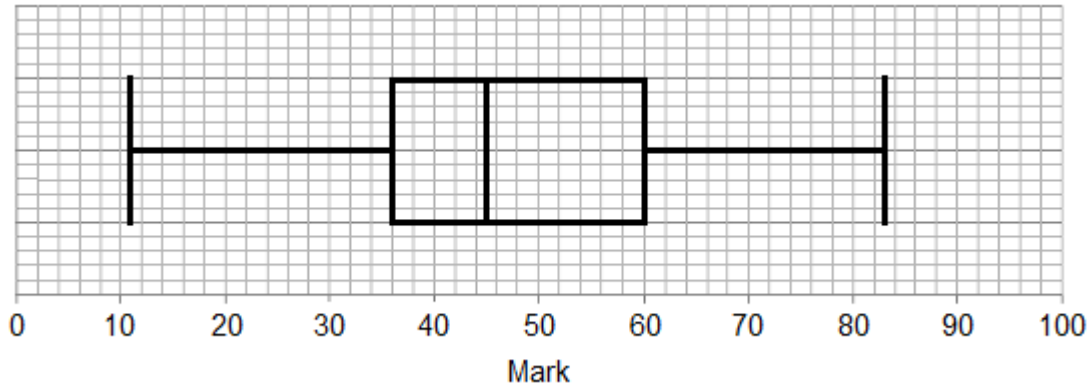
How much more did Theresa claim than Mark in March?

- The cumulative frequency graph gives information about the times it took 80 students to complete a homework task. Use the graph to find an estimate for the median time.



- Use the cumulative frequency graph above to find an estimate for the number of students who took longer than 40 minutes to complete the homework task.

5. The box plot shows information about 20 students' marks in a maths mock exam. Calculate the range of marks.



6. The table shows the monthly income for a gift shop. Draw a time series graph to show this information.

Month	May	June	July	August	September	October
Income (£)	1200	1400	3700	3900	1500	1000

7. Below is a table showing prices of two shares over a period of time.

Date	Share A price (pence)	Share B price (pence)
01/01/16	88.42	329.12
01/02/16	90.67	340.93
01/03/16	87.29	326.44
01/04/16	89.51	330.14
01/05/16	91.48	331.26
01/06/16	92.63	328.11

Calculate the range and mean for Share A and for Share B.

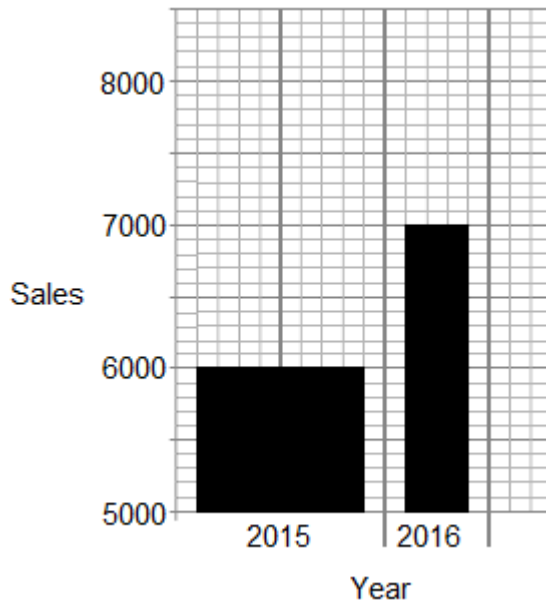
8. Below is a table showing the ages of people holidaying on a ship. Draw a cumulative frequency graph to show this information.

Age ( $x$ years)	Number of people
$0 < x \leq 10$	58
$10 < x \leq 20$	55
$20 < x \leq 30$	178
$30 < x \leq 40$	245
$40 < x \leq 50$	258
$50 < x \leq 60$	178
$60 < x \leq 70$	175
$70 < x \leq 80$	40
$80 < x \leq 90$	12
$90 < x \leq 100$	1

9. A school carries out a survey to find out what its students think about fast food. 100 students are randomly chosen to answer the survey questions. What is the population and what is the sample for this survey?
10. The table below shows information about the amount spent in a restaurant by 40 customers on a particular day. Calculate an estimate of the mean amount spent.

Amount spent (£ $x$ )	Frequency
$0 < x \leq 10$	18
$10 < x \leq 20$	10
$20 < x \leq 30$	8
$30 < x \leq 40$	3
$40 < x \leq 50$	1

11. A company claims that the bar chart below shows that their sales have doubled in 2016 compared to 2015. Describe two things that are wrong with the bar chart.

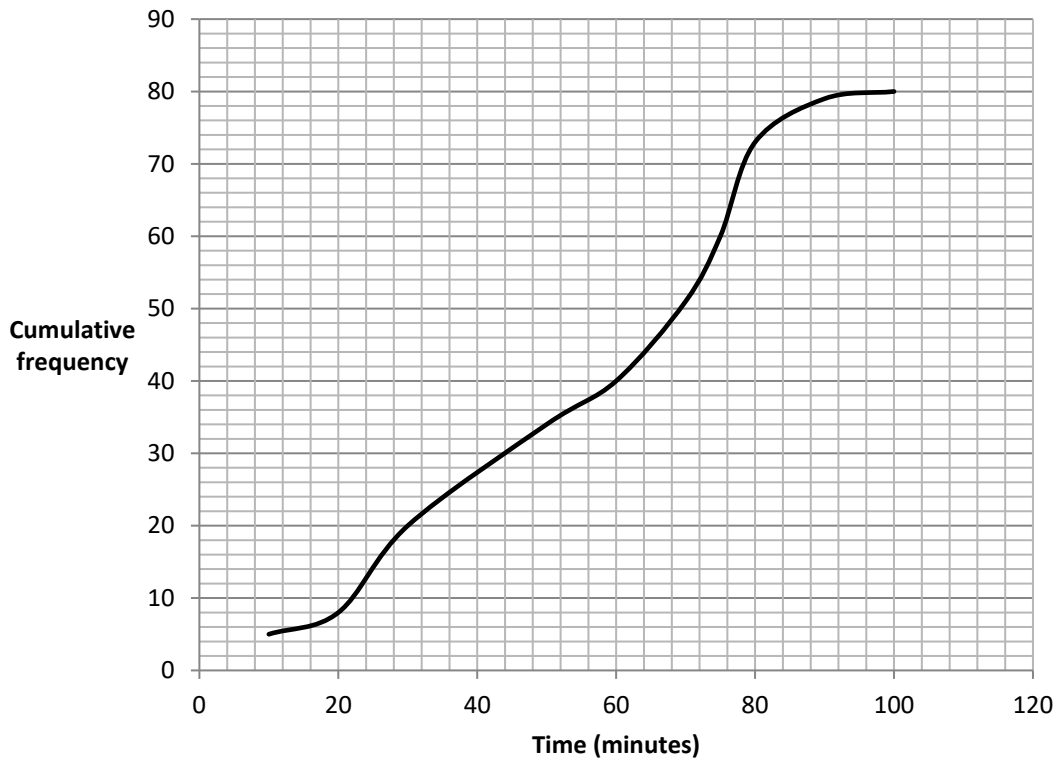


12. The table below shows information about the amount spent by two groups of individuals on a night out.

	Group A	Group B
Median	60	60
Interquartile range	10	30

Dylan says that Group B spent more on average than Group A. Give a reason why he may not be correct.

13. Casey has to decide which clinic to attend for treatment, Clinic A or Clinic B.  
The cumulative frequency curve shows waiting times for 80 patients in Clinic A.



Here is data for waiting times in Clinic B.

Median	70 minutes
Lower quartile	55 minutes
Upper quartile	80 minutes

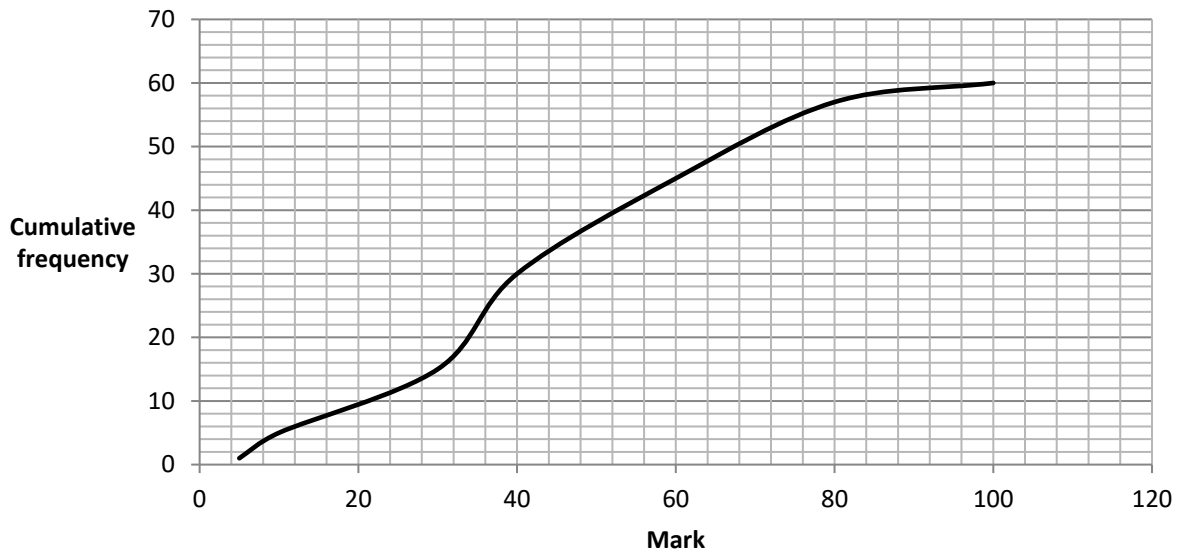
Based on waiting times, which clinic should Casey choose? Explain your answer.

14. Below is a table showing the number of letters sent using four different postage types from a Post Office. Draw a pie chart to show this information.

Postage	Frequency
First Class	200
Second Class	115
Recorded Delivery	180
Special Delivery	210

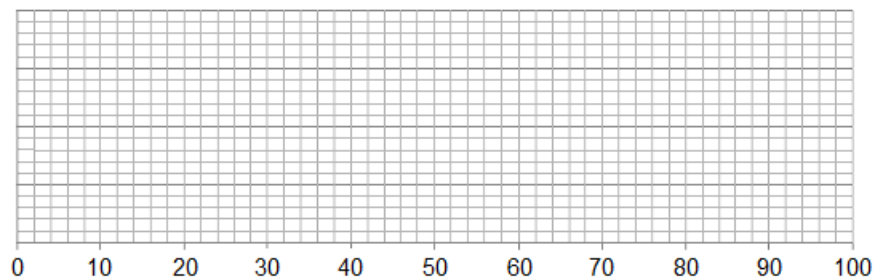
15. Outliers can significantly impact the mean. Explain what is meant by this.

16. The cumulative frequency graph gives information about the marks of 60 students who took a maths test.



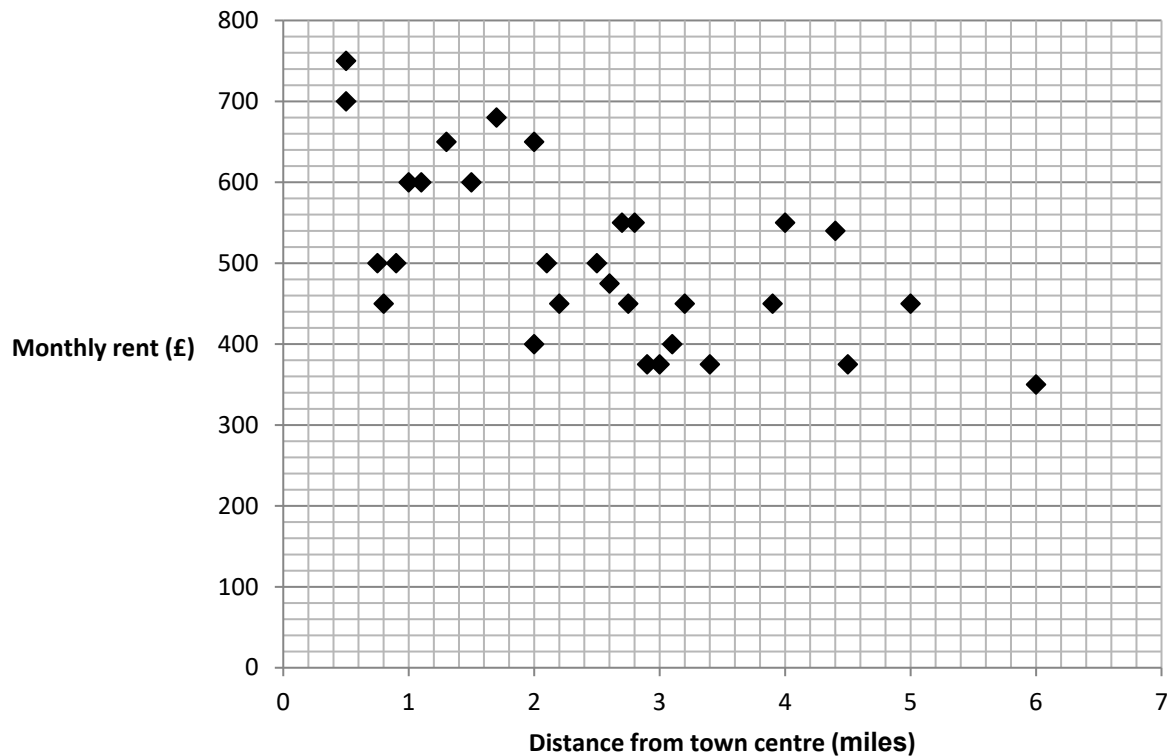
The lowest mark scored in the test was 3 and the highest mark scored was 97.

Use this information and the cumulative frequency graph to draw a box plot of the students' maths marks.



17. Use the cumulative frequency graph above to estimate the probability that a student chosen at random will achieve a mark greater than 80. Write this probability as a fraction.

18. Sean believes property is more expensive to rent nearer the town centre.  
The diagram shows the distance from the town centre and the monthly rent of 30 properties.



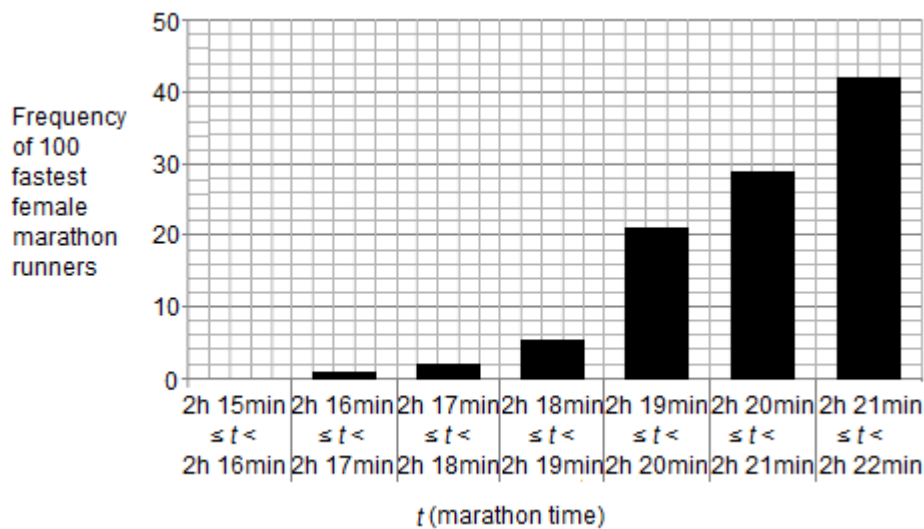
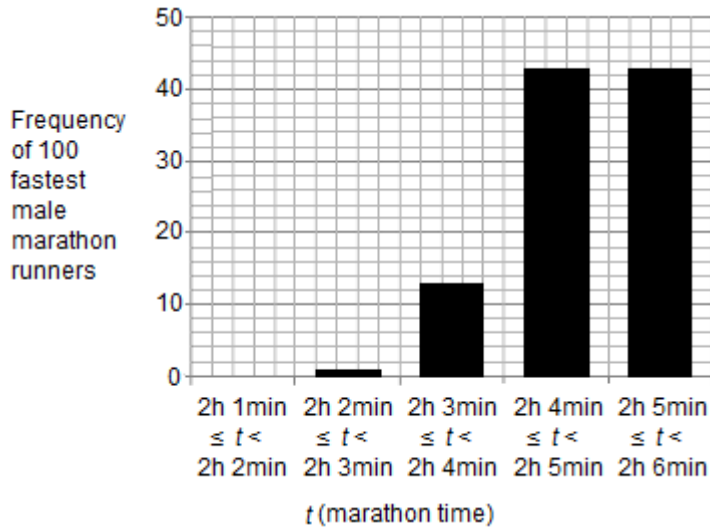
Does the diagram prove his claim? Give a reason for your decision.

19. Here are five values.

$$7 - x, -2, x - 3, 12 \text{ and } x^3 + 3$$

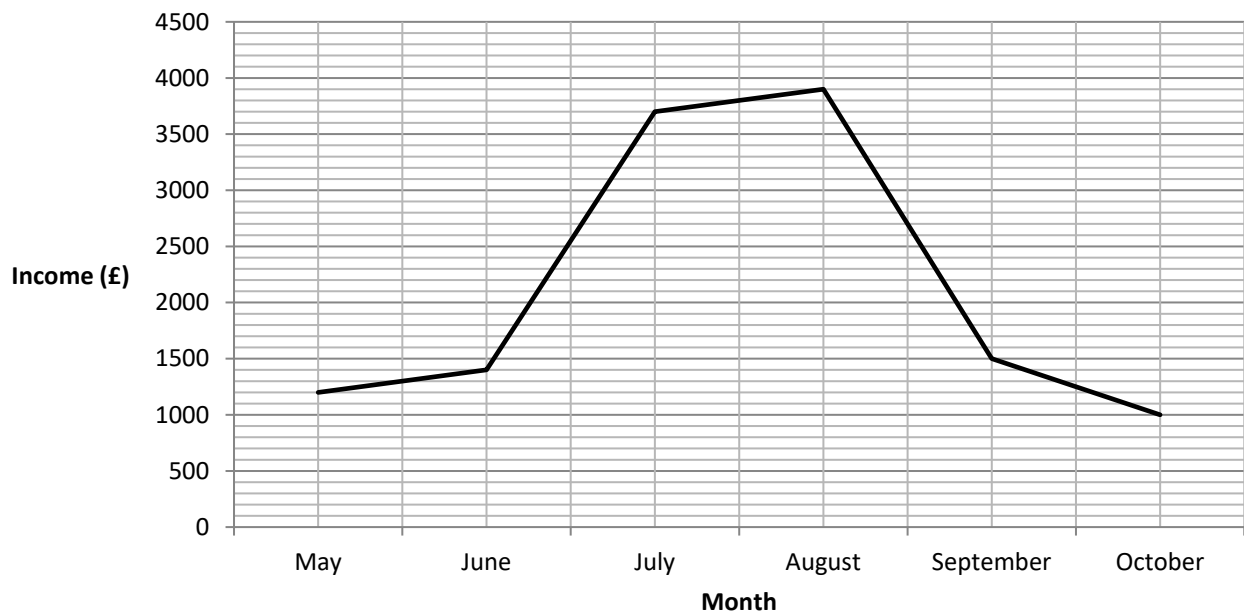
If the mean of these values is 5, list the five values numerically.

20. A marathon race is yet to be run in two hours or less. The graphs below show the frequency of times in the fastest 100 recorded times for men and for women. Use these graphs to find an estimate of the difference between the mean time for the 100 fastest men and the mean time for the 100 fastest women.



**Answers**

1. Negative
2. £40
3. 36-37 minutes
4. 38 students
5. Range =  $83 - 11 = 72$  marks
- 6.



7.

	Share A price (pence)	Share B price (pence)
<b>Range</b>	5.34	14.49
<b>Mean</b>	90	331



8.



9. The population is all the students at the school. The sample is the 100 students who are involved in answering the survey questions.

10.

Amount spent (£ $x$ )	Frequency	Midpoint	Frequency $\times$ midpoint
$0 < x \leq 10$	18	5	90
$10 < x \leq 20$	10	15	150
$20 < x \leq 30$	8	25	200
$30 < x \leq 40$	3	35	105
$40 < x \leq 50$	1	45	45
<b>Total</b>	<b>40</b>		<b>590</b>

Estimate of the mean amount spent =  $590 \div 40 = \text{£}14.75$ .

11. The scale on the bar chart is inappropriate as it should start at zero, and the bars should be of equal width rather than different widths.

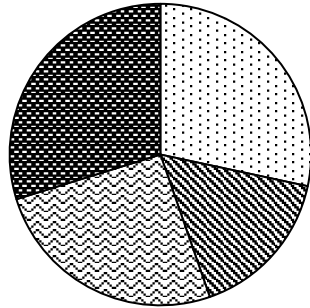
12. The table simply shows that the median is the same for each group and there is greater variation in the amount spent by those in Group B. The data does not provide sufficient information about the amount spent by individuals. For example, values for Group A could be 55, 55, 55, 60, 60, 60, 65, 65, 65 and values for Group B could be 25, 35, 35, 60, 60, 60, 65, 65, 65 in which case the Group B mean spend would be less than the Group A mean spend.

13. Clinic A: median = 60 mins; LQ = 30 mins; UQ = 75 mins; IQR = 45 mins.  
Clinic B: median = 70 mins; LQ = 55 mins; UQ = 80 mins; IQR = 25 mins.

Casey should choose Clinic A. The median waiting time is lower (60 mins compared to 70 mins in Clinic B) and while the interquartile range for Clinic A is higher than for Clinic B (45 mins compared to 25 mins), the lower and upper quartiles for Clinic A are both lower than the respective values for Clinic B.

14.

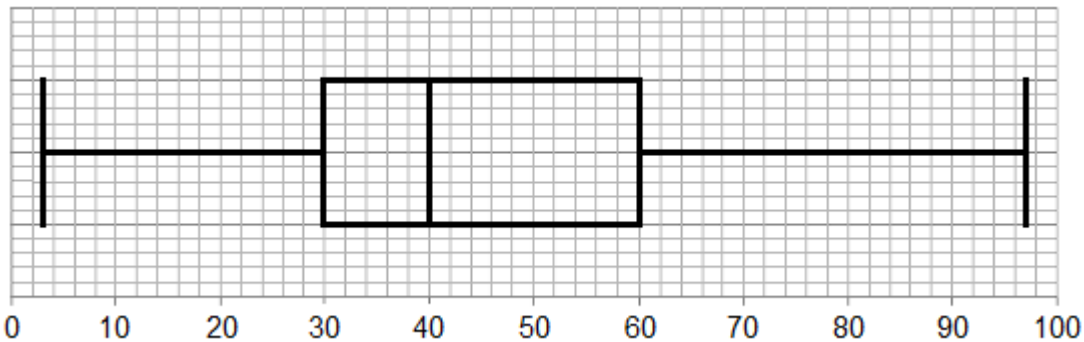
Postage	Frequency	Angle
First Class	200	102°
Second Class	115	59°
Recorded Delivery	180	92°
Special Delivery	210	107°



- First Class
- Second Class
- Recorded Delivery
- Special Delivery

15. An outlier is a value in a data set which is significantly smaller or larger than the rest. When calculating the mean of a data set that has outliers, the inclusion of the outliers can cause the mean to be much greater (or smaller) than if the outliers were excluded.

16.



17.  $\frac{3}{60} = \frac{1}{20}$

18. No, there are other factors involved e.g. type of property and number of bedrooms. The sample is also very small and may not represent the population very well.

19.  $x = 2$

Temperatures were 5°C, -2°C, -1°C, 12°C and 11°C.

20. The mean number of minutes for men is 2 hours 4 min to 2 hours 5 min.  
The mean number of minutes for females is 2 hours 20 min to 2 hours 21 min.  
The difference is 16 minutes.

# MATHEMATICS

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Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Describe correlation			
AO1	2	Interpret a multiple bar chart			
AO1	3	Calculate an estimate for the median from a cumulative frequency graph			
AO1	4	Interpret a cumulative frequency graph			
AO1	5	Interpret a box plot and calculate the range			
AO1	6	Construct a time series graph			
AO1	7	Calculate the range and mean			
AO1	8	Construct a cumulative frequency graph			
AO1	9	Define the population and sample			
AO1	10	Calculate an estimate of the mean of grouped data			
AO2	11	Recognise and explain graphical misrepresentation			
AO2	12	Interpret median and interquartile range			
AO2	13	Calculate estimates for the median, quartiles and interquartile range from a cumulative frequency graph			
AO2	14	Construct a pie chart			
AO2	15	Understand and appreciate that there may be errors in data from values (outliers)			
AO3	16	Draw a box plot			
AO3	17	Interpret and use graphical data to solve a problem			
AO3	18	Interpret results and know the difference between population and sample			
AO3	19	Solve a problem using the mean			
AO3	20	Solve a problem involving graphs			

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