Write your name here

Surname

Other names

Centre Number

Candidate Number

Pearson Edexcel
Level 1/Level 2 GCSE (9–1)

Mathematics
Paper 2 (Calculator)
Aiming for 7

Higher Tier

Spring 2023 Practice Paper
Time: 1 hour 30 minutes

Paper Reference
1MA1/2H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142

  unless the question instructs otherwise.

Information

- The total mark for this paper is 80. There are 22 questions.
- Questions have been arranged in an ascending order of mean difficulty, as found by students achieving Grade 7 in the Summer and November 2022 examinations.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL TWENTY FOUR questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1   Ella invests £7000 for 2 years in an account paying compound interest.

In the first year, the rate of interest is 3%
In the second year, the rate of interest is 1.5%

Work out the value of Ella's investment at the end of 2 years.

£..

(Total for Question 1 is 3 marks)

2 A box in the shape of a cuboid is placed on a horizontal floor.

The box exerts a force of 180 newtons on the floor.
The box exerts a pressure of 187.5 newtons/m^2 on the floor.

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The face in contact with the floor is a rectangle of length 1.2 metres and width x metres.

Work out the value of x.

$x =$ ....

(Total for Question 2 is 3 marks)

---

3 A new phone cost £679
The value of the phone decreases at a rate of 4% per year.

Work out the value of the phone at the end of 3 years.

£..

(Total for Question 3 is 3 marks)

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4   Chanda buys a necklace for £120
She sells the necklace for £135

Work out her percentage profit.

....%

(Total for Question 4 is 3 marks)

5
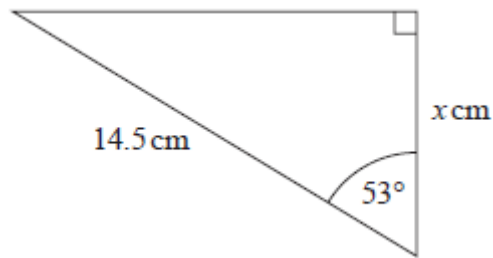
Work out the value of x.
Give your answer correct to 3 significant figures.

$x = $ ....

(Total for Question 5 is 2 marks)

6 In Spain, Sam pays 27 euros for 18 litres of petrol.
In Wales, Leo pays £40.80 for 8 gallons of the same type of petrol.

1 euro = £0.85
4.5 litres = 1 gallon

Sam thinks that petrol is cheaper in Spain than in Wales.

Is Sam correct?
You must show how you get your answer.

(Total for Question 6 is 4 marks)

7 Saffron wants to work out an estimate for the total number of fish in a lake.

On Friday, Saffron catches 180 fish from the lake.
She puts a tag on each of these fish and puts them back into the lake.

On Saturday, Saffron catches 305 fish from the same lake.
She finds that 45 of the 305 fish are tagged.

Work out an estimate for the total number of fish in the lake.

....

(Total for Question 7 is 3 marks)

8 The equation of the line $\mathbf{L_1}$ is $y = 2x + 3$
The equation of the line $\mathbf{L_2}$ is $5y - 10x + 4 = 0$

Show that these two lines are parallel.

(Total for Question 8 is 2 marks)

9 Festival A will be in a rectangular field with an area of 80 000 m^2
The greatest number of people allowed to attend Festival A is 425

Festival B will be in a rectangular field 700 m by 2000 m.
The greatest number of people allowed to attend Festival B is 6750

The area per person allowed for Festival B is greater than the area per person allowed for Festival A.

(*a*) How much greater?
Give your answer correct to the nearest whole number.

.... m^2

(4)

Callum says,

    "300 cm^2 is the same as 3 m^2 because there are 100 cm in 1 m so you divide by 100"

Callum's method is wrong.

(*b*) Explain why.

....

....

....

(1)

(Total for Question 9 is 5 marks)

10 (*a*) Simplify $(x^3)^5$

....
(1)

(*b*) Expand and simplify $4(x + 3) + 7(4 - 2x)$

....
(2)

(*c*) Factorise fully $15x^3 + 3x^2y$

....
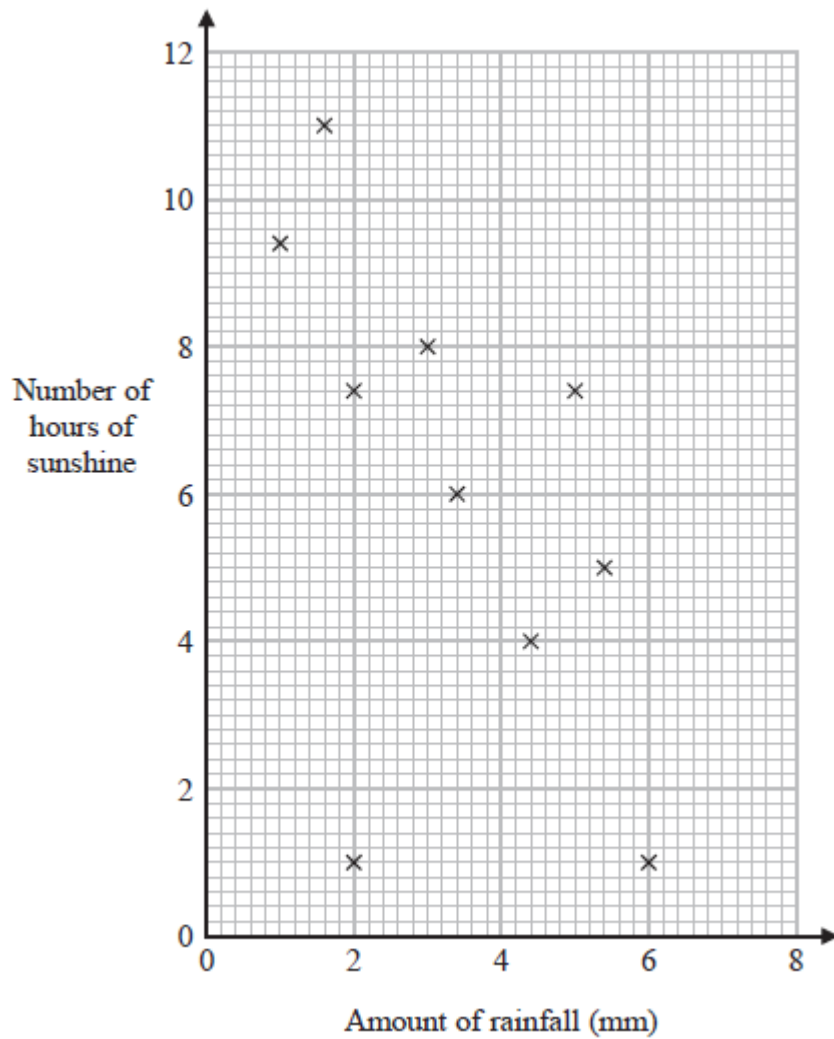**(2)**

(Total for Question 10 is 5 marks)

11 The scatter graph shows information about the amount of rainfall, in mm, and the number of hours of sunshine for each of ten English towns on the same day.

One of the points is an outlier.

(*a*) Write down the coordinates of this point.

(.............................. , ...)

(1)

(*b*) Ignoring the outlier, describe the relationship between the amount of rainfall and the number of hours of sunshine.

....

....

....

(1)

On the same day in another English town there were 7 hours of sunshine.

(*c*) Using the scatter graph, estimate the amount of rainfall in this town on this day.

.... mm

(2)

(Total for Question 11 is 4 marks)

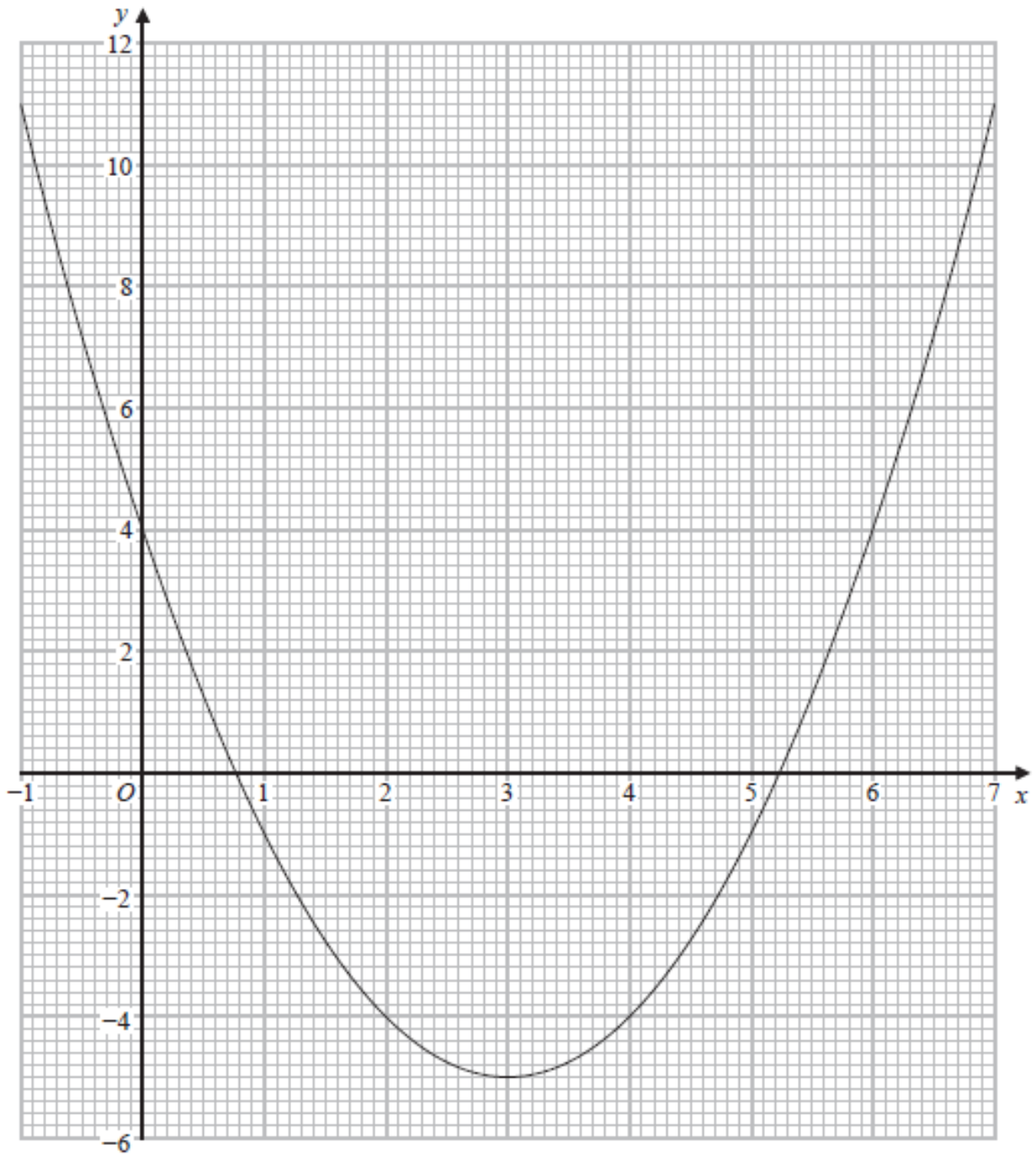**12** The length of a football pitch is 90 metres, correct to the nearest metre.

Complete the error interval for the length of the football pitch.

.... m ≤ length < .... m

(Total for Question 12 is 2 marks)

13 Here is the graph of $y = x^2 - 6x + 4$

(*a*) Write down the *y* intercept of the graph of $y = x^2 - 6x + 4$

....
(1)

(*b*) Write down the coordinates of the turning point of the graph of $y = x^2 - 6x + 4$

(........................ , ...)
(1)

(*c*) Use the graph to find estimates for the roots of $x^2 - 6x + 4 = 0$

....
(2)

(Total for Question 13 is 4 marks)

---

14 Kieron has 13 workers he can use for a job.

He knows that 6 workers would take $14\frac{1}{2}$ days to complete this job.

Show that Kieron has enough workers to finish this job in less than 7 days.

(Total for Question 14 is 3 marks)

15 Using algebra, prove that $1.06\dot{2}$ can be written as $1\frac{14}{225}$

(Total for Question 15 is 3 marks)

16 Use your calculator to work out

$$\frac{\sqrt[3]{1.57^4 + \tan 60°}}{7.2^{\frac{1}{2}}}$$

Give your answer correct to 3 significant figures.

....

(Total for Question 16 is 2 marks)

17 Here are the equations of two straight lines.

$$y = \frac{1}{2}x - 6 \qquad 6y = 3x + 7$$

Oscar says that these lines are parallel.

Is Oscar correct?
You must give a reason for your answer.

....

....

....

(Total for Question 17 is 2 marks)

---

18 Here are the first five terms of an arithmetic sequence.

$$7 \qquad 13 \qquad 19 \qquad 25 \qquad 31$$

(*a*) Find an expression, in terms of *n*, for the *n*th term of this sequence.

....

(2)

The *n*th term of a different sequence is $8 - 6n$

(*b*) Is −58 a term of this sequence?
You must show how you get your answer.

(2)

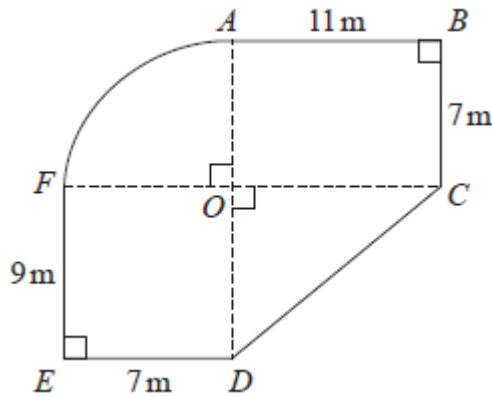**(Total for Question 18 is 4 marks)**

19 The diagram shows a plan of Jason's garden.

ABCO and *DEFO* are rectangles.
CDO is a right-angled triangle.
AFO is a sector of a circle with centre *O* and angle *AOF* = 90°

Jason is going to cover his garden with grass seed.

Each bag of grass seed covers 14 m² of garden.
Each bag of grass seed costs £10.95

Work out how much it will cost Jason to buy all the bags of grass seed he needs.

£...

(Total for Question 19 is 5 marks)

20 Faiza is studying the population of rabbits in a park.
She wants to estimate the number of rabbits in the park.

On Monday she catches a random sample of 20 rabbits in the park, marks each rabbit with a tag and releases them back into the park.

On Tuesday she catches a random sample of 42 rabbits in the park.
12 of the rabbits are marked with a tag.

(*a*) Find an estimate for the number of rabbits in the park.

....
(3)

Albie is studying the population of rabbits in a wood.

One day, he catches 55 rabbits and finds that 40 of these rabbits are marked with a tag.
Albie estimates there are 50 rabbits in the wood.
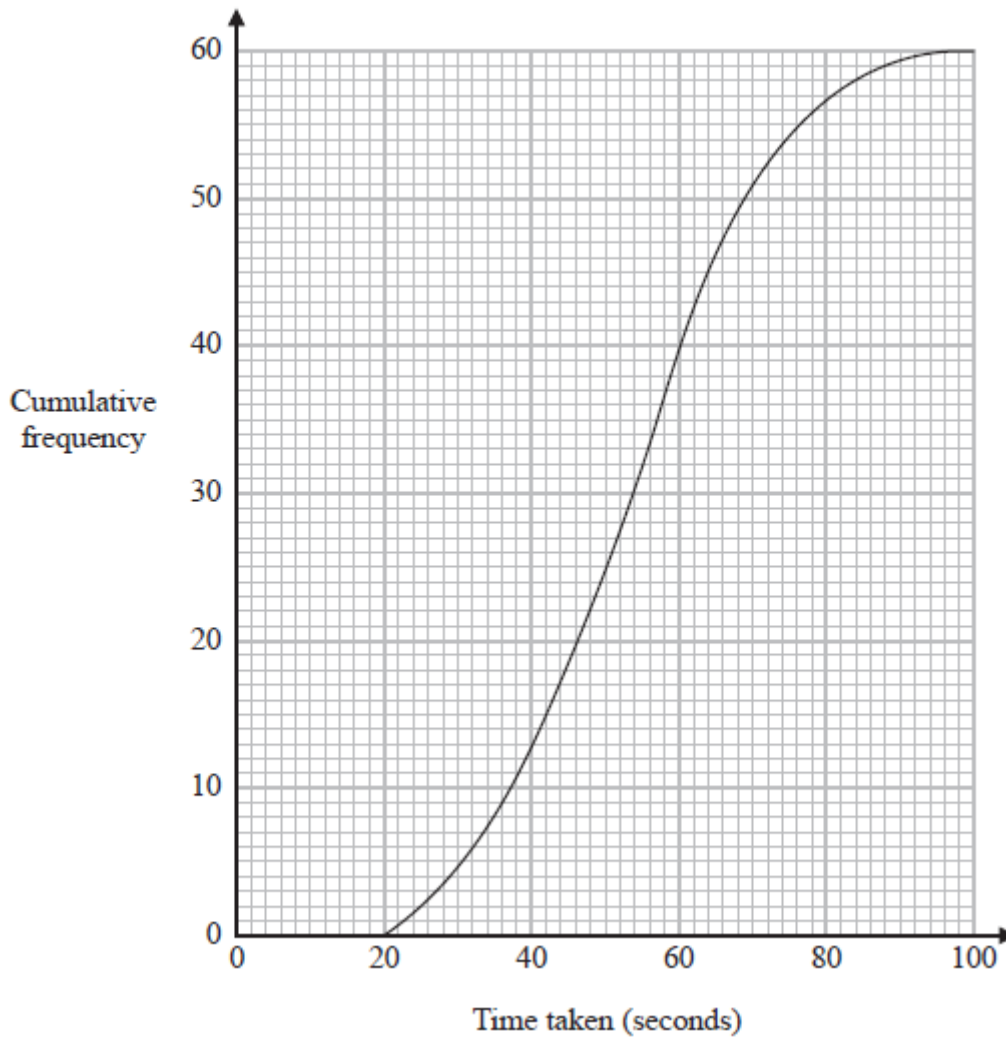
(*b*) Explain why Albie's estimate cannot be correct.

....
.
....
.
....
**(1)**

(Total for Question 20 is 4 marks)

21 In an experiment, 60 students each completed a puzzle.
The cumulative frequency graph shows information about the times taken for the 60 students to complete the puzzle.
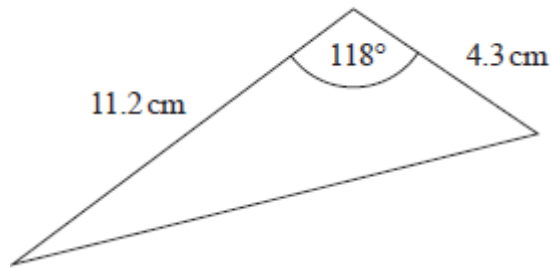

Time taken (seconds)

For these 60 students,

the least time taken was 24 seconds
the greatest time taken was 96 seconds.

On the grid below, draw a box plot for the distribution of the times taken by the students.

Time taken (seconds)
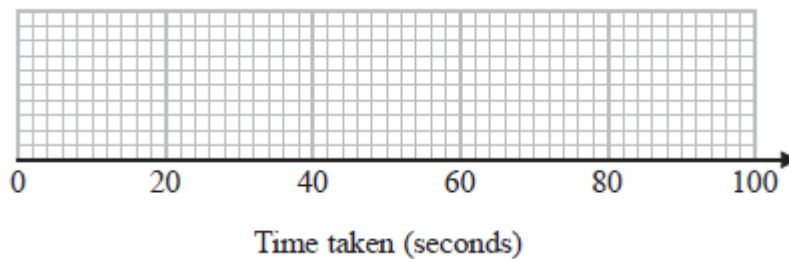
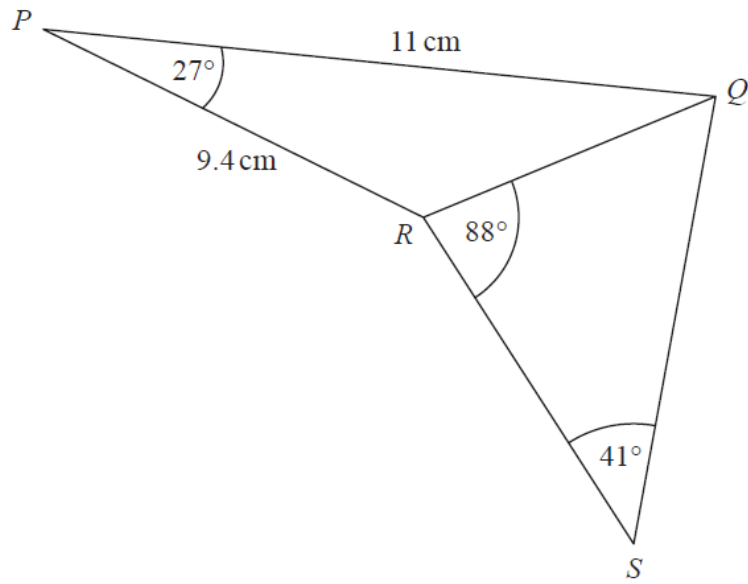**(Total for Question 21 is 3 marks)**

22 Here is a triangle.

Work out the area of the triangle.
Give your answer correct to 3 significant figures.

.... cm^2
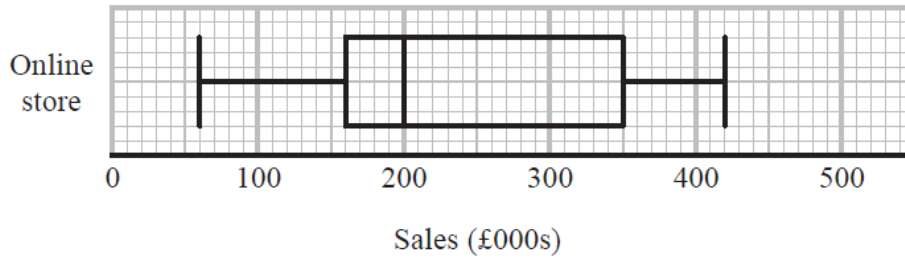
(Total for Question 22 is 2 marks)

23 *PQR* and *QRS* are triangles.

Calculate the length of *QS*.
Give your answer correct to 3 significant figures.
You must show all your working.

.... cm

(Total for Question 2 is 4 marks)

24 The box plot shows information about the sales, in thousands of pounds (£000s), of an online store each month.

Online store

Sales (£000s)

Andrew says,

"Three quarters of the given data lies between 160 000 and 350 000 because these are the values of the lower quartile and the upper quartile."

Andrew is wrong.
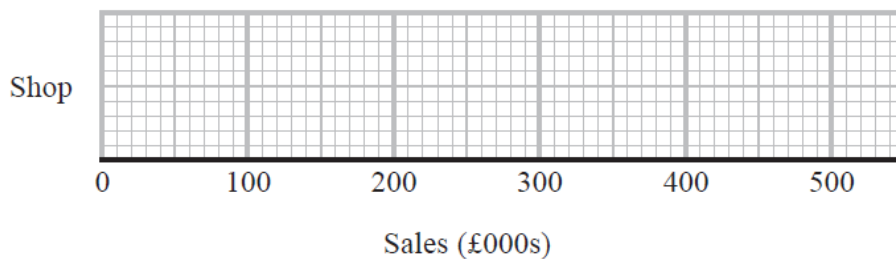
(*a*) Explain why.

....

....

....

(1)

The table shows information about the sales, in £000s, in a shop each month.

	Sales (£000s)
least value	30
lower quartile	80
median	170
upper quartile	260
greatest value	350

(*b*) On the grid below, draw a box plot for this information.

Shop

Sales (£000s)

(2)

(*c*) Compare the distribution of the sales of the online store with the distribution of the sales in the shop.

(2)

(Total for Question 24 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

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