

Line Graphs and Time Series

Solutions

For Pearson Edexcel GCSE Mathematics (1MA1) • Foundation tier

Each question is shown in grey, followed by the working, one step per line. The final answer is in a box. *Marks* shows how the marks are usually given in the exam, and **Tip** points out a common mistake.

1 (3 marks)

The table shows the number of cars in a car park at different times on one day.

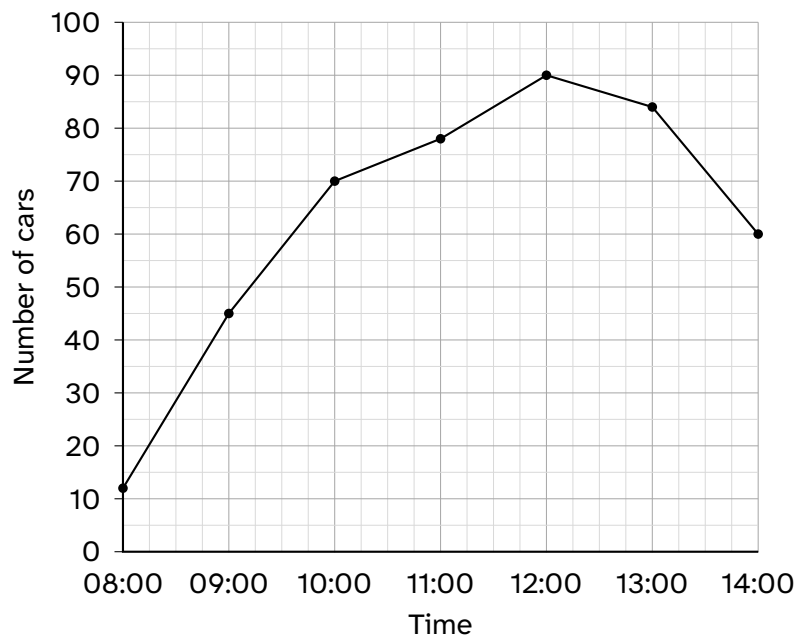
Time	08:00	09:00	10:00	11:00	12:00	13:00	14:00
Number of cars	12	45	70	78	90	84	60

(a) Draw a time series graph for this information.

Plot each time against the number of cars from the table.

Each small square on the vertical axis is 5 cars.

Join the points with straight lines, using a ruler.



Answer: Points plotted and joined

Tip: Use straight lines between the points. Don't draw a curve, and don't join the first point to the last.

Marks: 2 marks for a fully correct graph. 1 mark for at least five points plotted correctly.

(b) Between which two times did the number of cars increase the most?

Work out each increase:

08:00 to 09:00: $45 - 12 = 33$

09:00 to 10:00: $70 - 45 = 25$

10:00 to 11:00: $78 - 70 = 8$

11:00 to 12:00: $90 - 78 = 12$

After 12:00 the number goes down.

The biggest increase is 33.

Answer: 08:00 and 09:00

2 (4 marks)

The table shows the number of visitors to a museum each month.

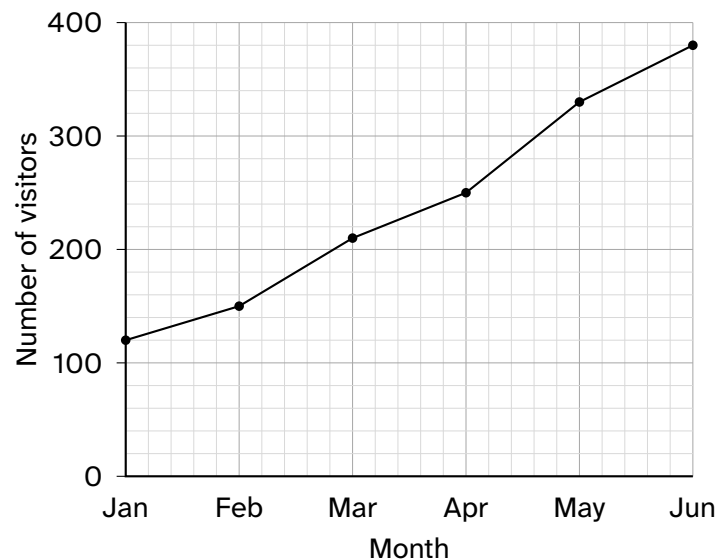
Month	Jan	Feb	Mar	Apr	May	Jun
Visitors	120	150	210	250	330	380

- (a) Complete the time series graph.

Each small square on the vertical axis is 20 visitors.

Plot (Apr, 250), (May, 330), (Jun, 380).

Join each point to the next with a straight line.



Answer: Points plotted and joined

Tip: Check the scale: one small square is 20 here, so 250 is halfway between 240 and 260.

Marks: 2 marks for all three points plotted and joined. 1 mark for two correct points.

- (b) Describe the trend in the number of visitors.

The trend is the general direction of the graph.

The number of visitors goes up every month.

Answer: Increasing

- (c) Between which two months was the greatest increase in the number of visitors?

Work out each increase:

Jan to Feb: $150 - 120 = 30$

Feb to Mar: $210 - 150 = 60$

Mar to Apr: $250 - 210 = 40$

Apr to May: $330 - 250 = 80$

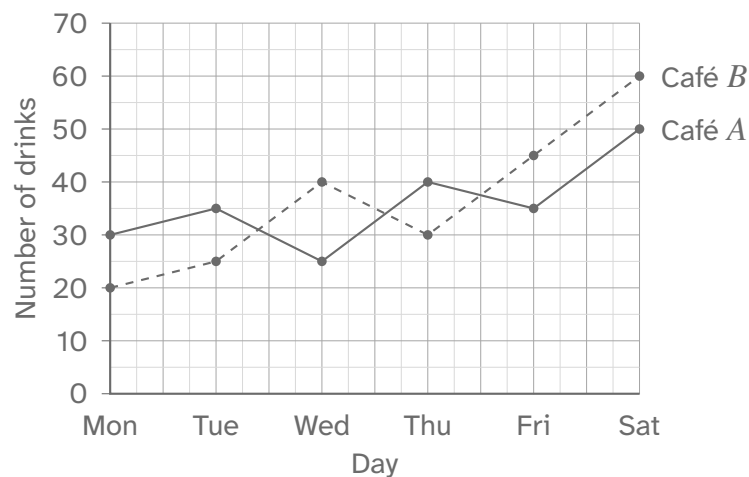
May to Jun: $380 - 330 = 50$

The biggest increase is 80.

Answer: April and May

3 (3 marks)

The graph shows the number of hot drinks sold by two cafés, *A* and *B*, each day for six days.



- (a) On how many days did Café *A* sell more drinks than Café *B*?

Look for the days where the line for Café *A* is above the line for Café *B*.

Monday: 30 and 20

Tuesday: 35 and 25

Thursday: 40 and 30

That is 3 days.

Answer: 3

- (b) Work out the total number of drinks sold by Café *B* on Friday and Saturday.

Café *B* is the dashed line.

Friday: 45

Saturday: 60

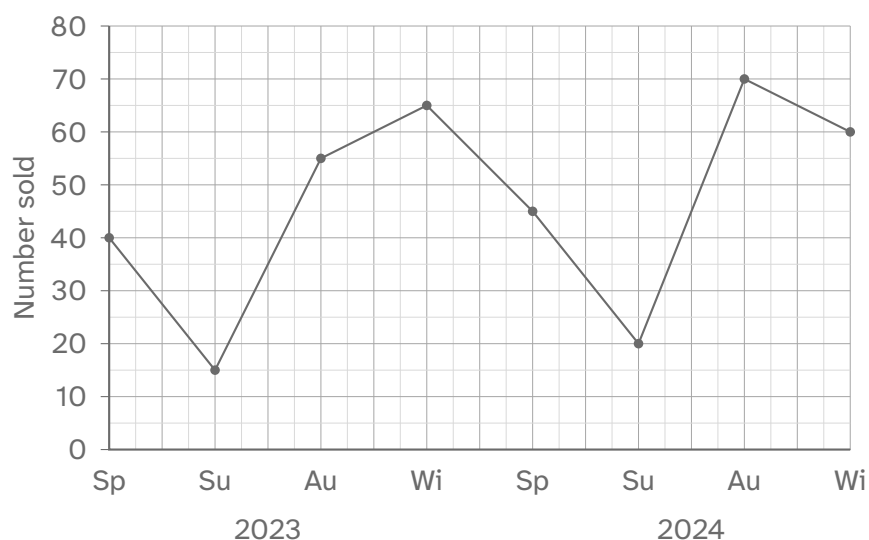
$$45 + 60 = 105$$

Answer: 105

Marks: 1 mark for reading 45 and 60. 1 mark for 105.

4 (4 marks)

The time series graph shows the number of umbrellas sold by a shop in each season of 2023 and 2024.



- (a) Write down the number of umbrellas sold in Autumn 2024.

Autumn 2024 is the third point in the 2024 section (Au).

Read across to the vertical axis: 70

Answer: 70

- (b) Work out the total number of umbrellas sold in 2024.

Read the four 2024 values:

Spring 45, Summer 20, Autumn 70, Winter 60

$$45 + 20 + 70 + 60 = 195$$

Answer: 195

Tip: Make sure you use the four seasons of 2024, not 2023. The year labels are under the axis.

Marks: 1 mark for adding four correct readings. 1 mark for 195.

- (c) Kay says, *“Sales are always highest in Winter.”*

Is Kay correct?

Give a reason for your answer.

No.

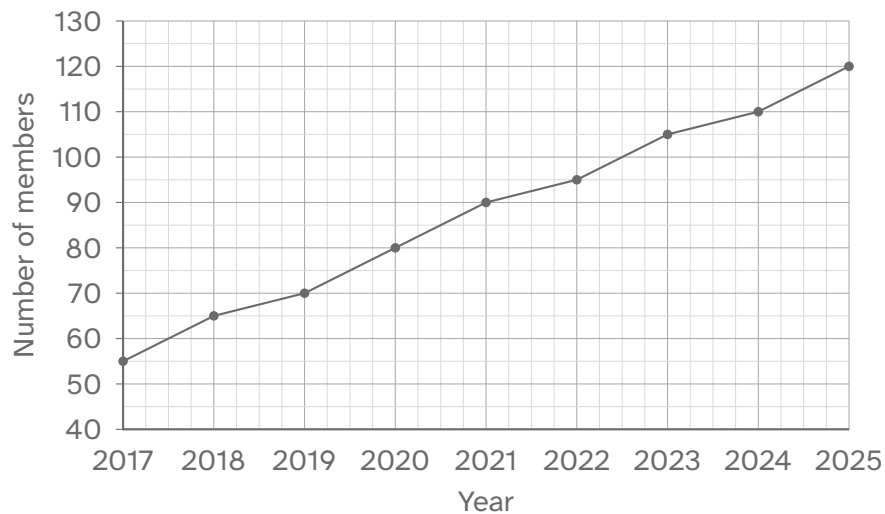
In 2024, Autumn (70) is higher than Winter (60).

So sales are not always highest in Winter.

Answer: No, Autumn 2024 is higher

5 (3 marks)

The time series graph shows the number of members of a swimming club at the start of each year from 2017 to 2025



- (a) Describe the trend in the number of members.

The trend is the general direction of the graph.

The line goes up from 55 in 2017 to 120 in 2025.

So the number of members increased over the period.

Answer: Increasing

- (b) Write down the first year in which the club had more than 100 members.

Find where the line first goes above 100 on the vertical axis.

2022: 95 members (not more than 100).

2023: 105 members.

Answer: 2023

- (c) The club secretary uses the graph to predict that the club will have 170 members in 2031

Give **one** reason why this prediction may not be reliable.

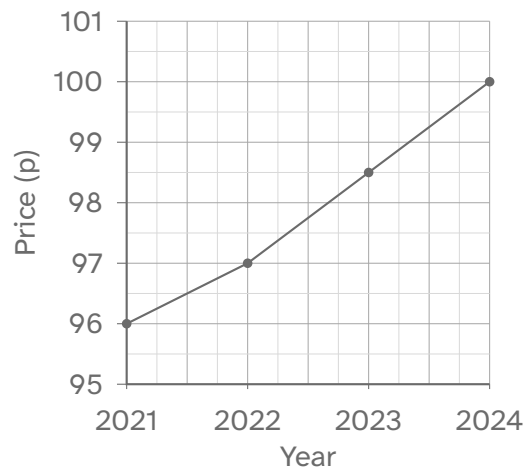
2031 is six years after the last point on the graph.

The trend may not continue for that long, e.g. the pool may not have space for more members.

Answer: 2031 is well outside the data; the trend may not continue

6 (1 mark)

Leon draws this graph to show the price of a bus ticket, in pence, over four years.



Leon says, “*The price of a ticket has more than doubled.*”

Is Leon correct?

You must give a reason for your answer.

No.

The price only went up from 96p to 100p.

Double 96p would be 192p, so the price has not doubled.

The vertical axis starts at 95, not 0.

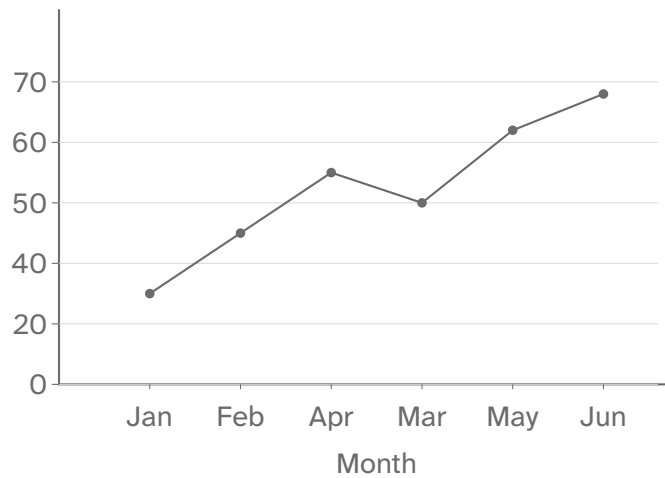
This makes the rise look much bigger than it really is.

Answer: No: it only went from 96p to 100p (the axis starts at 95, not 0)

Tip: Read the actual values from the axis. The line looks steep only because the axis does not start at 0.

7 (2 marks)

A bookshop records the number of books it sells each month from January to June. Mia draws this graph to show the information.



Give **two** criticisms of Mia's graph.

Any two of these:

The months are in the wrong order: April is plotted before March.

The scale on the vertical axis is not even: it goes up in 20s from 0 to 40, then in 10s.

The vertical axis has no label, so you cannot tell what the numbers mean.

Answer: Months in wrong order (Apr before Mar); uneven vertical scale; no vertical axis label

Tip: Say exactly what is wrong, e.g. "the vertical scale goes 0, 20, 40, then 50". "The graph is wrong" is too vague to score.

Marks: 1 mark for each different correct criticism.