Time series and trend lines

Grade 4 | Worked solutions

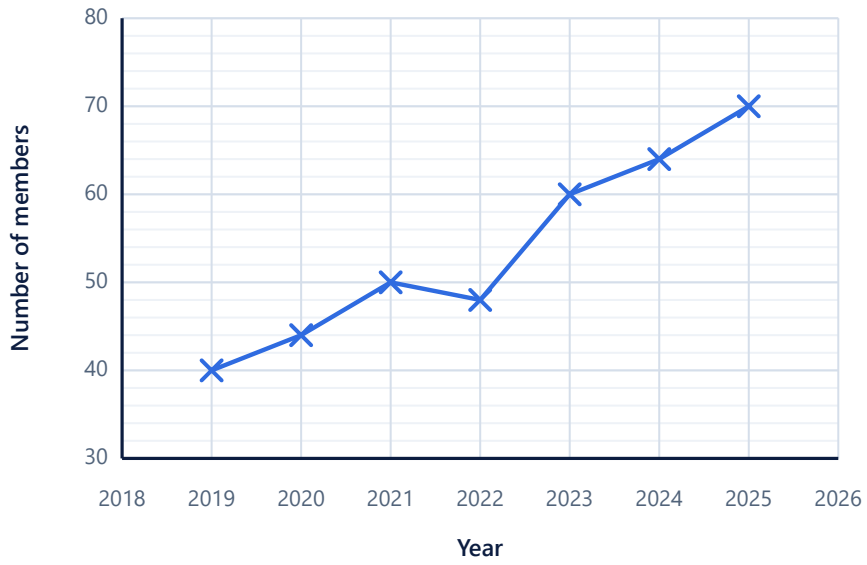
GCSE Statistics topic practice

1 The time series graph shows the number of members of a chess club at the start of each year from 2019 to 2025.

a. Write down the number of members in 2022. (1)

b. Between which two years next to each other did the number of members increase the most? (1)

c. Describe the trend in the number of members. (1)



(3 marks)

a)

The point for 2022 is at 48

b)

The steepest part is from 2022 to 2023

60 - 48 = 12

It went up by 12 members.

c)

Upward trend. The number of members is increasing.

a) 48 b) 2022 to 2023 c) upward trend

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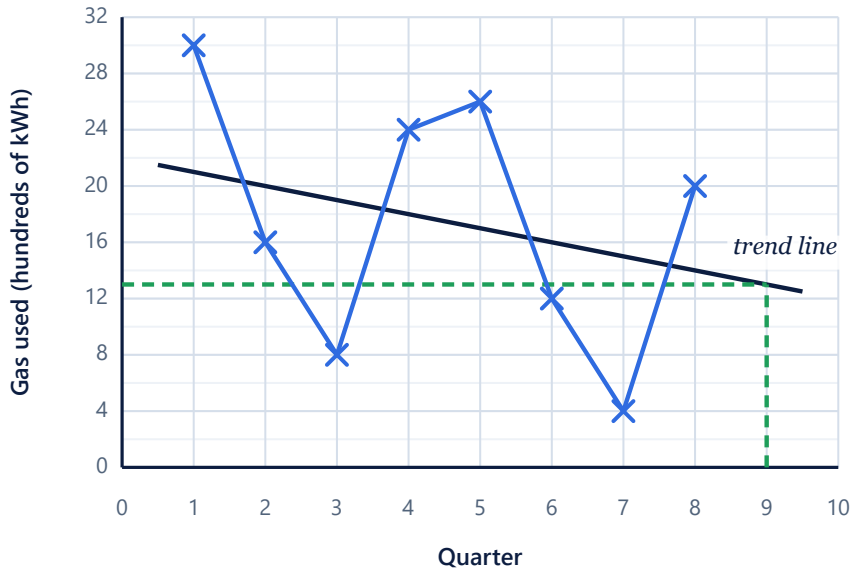
2 The time series graph shows the amount of gas, in hundreds of kWh, used by a household in each quarter of 2024 and 2025. Quarter 1 is January to March 2024 and quarter 5 is January to March 2025.

A trend line has been drawn on the graph.

a. Describe the trend in the amount of gas used. (1)

b. In which three months of each year does the household use the most gas? Suggest a reason for this. (2)

c. Use the trend line to find the trend value for quarter 9. (1)



(4 marks)

a)

Downward trend. The amount of gas used is falling.

b)

The peaks are at quarters 1 and 5

These are both January to March.

It is winter, so the heating is used more.

c)

Go up from quarter 9 to the trend line, then across.

About 13 hundred kWh

a) falling b) January to March, winter c) 13

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3 The table shows the number of visitors, in thousands, to a museum in each quarter of 2024 and 2025.

Year	2024	2024	2024	2024	2025	2025	2025	2025
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Visitors (thousands)	12	18	26	14	16	22	30	18

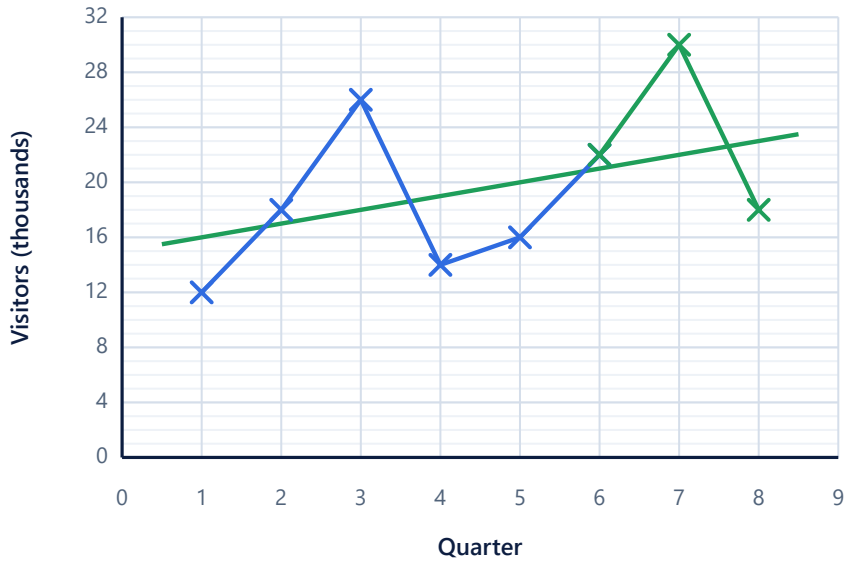
The first six values have been plotted on the time series graph. On the graph the quarters are numbered 1 to 8, so quarter 1 is Q1 of 2024 and quarter 5 is Q1 of 2025.

a. Complete the time series graph. (1)

b. Draw a trend line on the graph. (1)

c. Describe the trend in the number of visitors. (1)

d. Describe the seasonal variation in the number of visitors. (1)



(4 marks)

a)

Plot (7, 30) and (8, 18)

Join them to the graph with straight lines.

b)

Draw one straight line through the middle of the highs and the lows.

c)

Upward trend. Visitor numbers are increasing.

d)

Each year it is highest in Q3 and lowest in Q1.

a) 30, 18 plotted b) line drawn c) rising d) peak in Q3

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4 The table shows the number of electric cars, in hundreds, registered in a town at the end of each year.

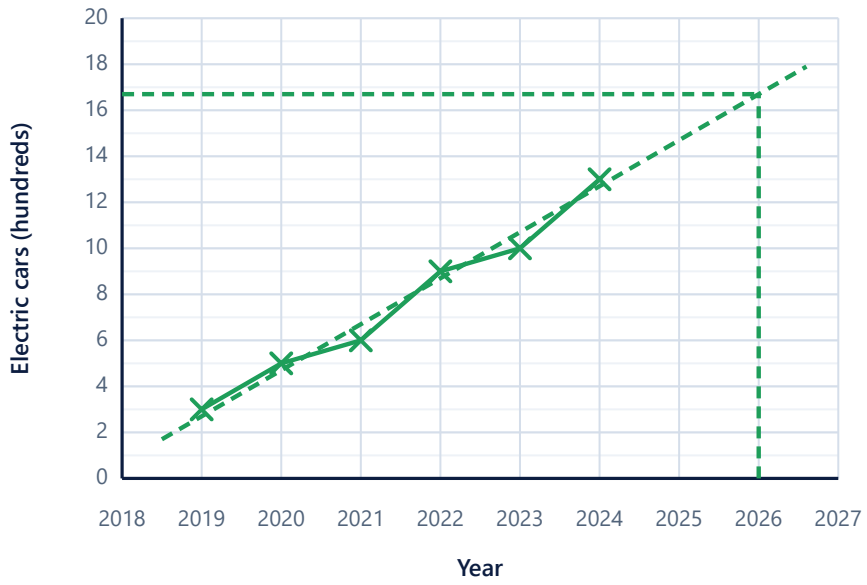
Year	2019	2020	2021	2022	2023	2024
Electric cars (hundreds)	3	5	6	9	10	13

a. On the grid, draw a time series graph for this information. (2)

b. Draw a trend line on your graph. (1)

c. Use your trend line to predict the number of electric cars registered in the town at the end of 2026. (1)

d. Give one reason why this prediction may not be reliable. (1)



(5 marks)

a)

Plot (2019, 3) (2020, 5) (2021, 6)

Plot (2022, 9) (2023, 10) (2024, 13)

Join the points in order with straight lines.

b)

Draw one straight line through the middle of the points.

c)

Extend the trend line to 2026, then read across.

About 17 hundred, which is 1700

d)

2026 is outside the range of the data.

The trend may not continue.

a) graph b) trend line c) about 1700 d) extrapolation

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5 A cafe opens on Friday, Saturday and Sunday. The table shows the number of customers on each day for three weeks.

Week	**1**	**1**	**1**	**2**	**2**	**2**	**3**	**3**	**3**
Day	Fri	Sat	Sun	Fri	Sat	Sun	Fri	Sat	Sun
Customers	60	90	75	70	100	85	80	110	95

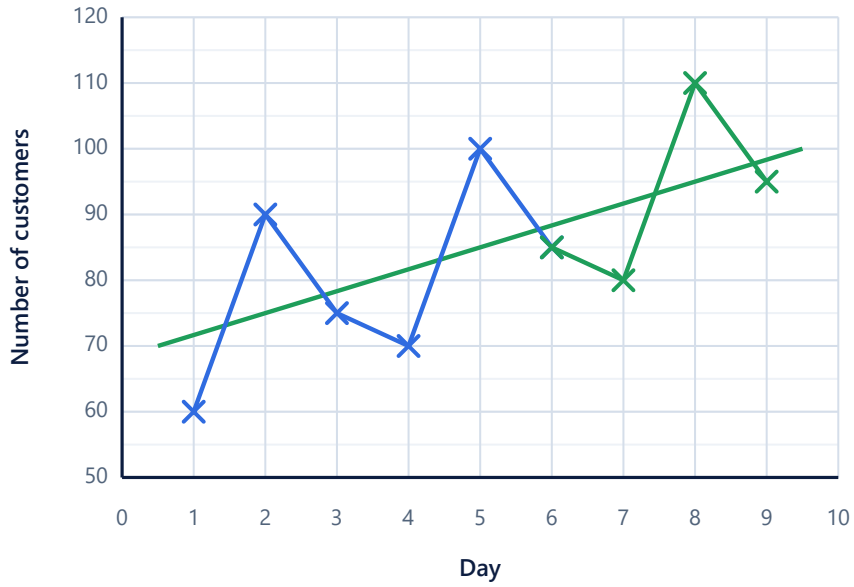
The first six values have been plotted on the time series graph. The days are numbered 1 to 9, so day 1 is Friday of week 1 and day 4 is Friday of week 2.

a. Complete the time series graph. (1)

b. Draw a trend line on the graph. (1)

c. Hugo says, "The number of customers fell from 75 on Sunday of week 1 to 70 on Friday of week 2, so the cafe is getting less popular." Explain why Hugo is wrong. (2)

d. Give one reason why the trend line may not give a reliable prediction for week 10. (1)



(5 marks)

a)

Plot (7, 80) (8, 110) (9, 95)

Join them to the graph with straight lines.

b)

Draw one straight line through the middle of the highs and the lows.

c)

Friday is the quietest day every week.

The fall is just part of the weekly pattern.

The trend line goes up,

so the number of customers is increasing.

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d)

Week 10 is far outside the range of the data.

The trend may not continue.

a) plotted b) line c) weekly pattern d) outside the data

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