Seasonal variation and predictions

Grade 6 | Higher | 5 questions, 21 marks

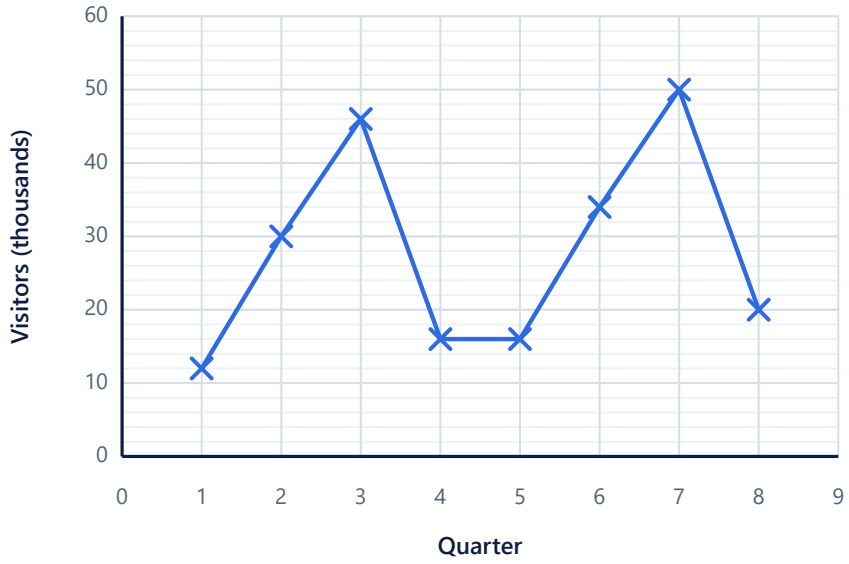
GCSE Statistics topic practice

Name: _____ **Date:** _____ **Score:** _____ **/ 21**

1 The time series graph shows the number of visitors, in thousands, to a seaside theme park in each quarter of 2023 and 2024. Quarter 1 is January to March 2023 and quarter 5 is January to March 2024.

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

b. Describe the seasonal variation in the number of visitors. (2)



(3 marks)

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2 The table shows the sales of a garden centre, in thousands of pounds, for each quarter of 2024. It also shows the trend value for each quarter, read from a trend line.

Quarter of 2024	**1**	**2**	**3**	**4**
Actual sales (£ thousands)	52	68	75	61
Trend value (£ thousands)	60	62	64	66

a. Work out the seasonal variation for each quarter. (2)

b. Interpret the seasonal variation for quarter 3. (1)

c. The trend value for quarter 3 of 2025 is £72 thousand. Use your seasonal variation for quarter 3 to estimate the sales in quarter 3 of 2025. (1)

(4 marks)

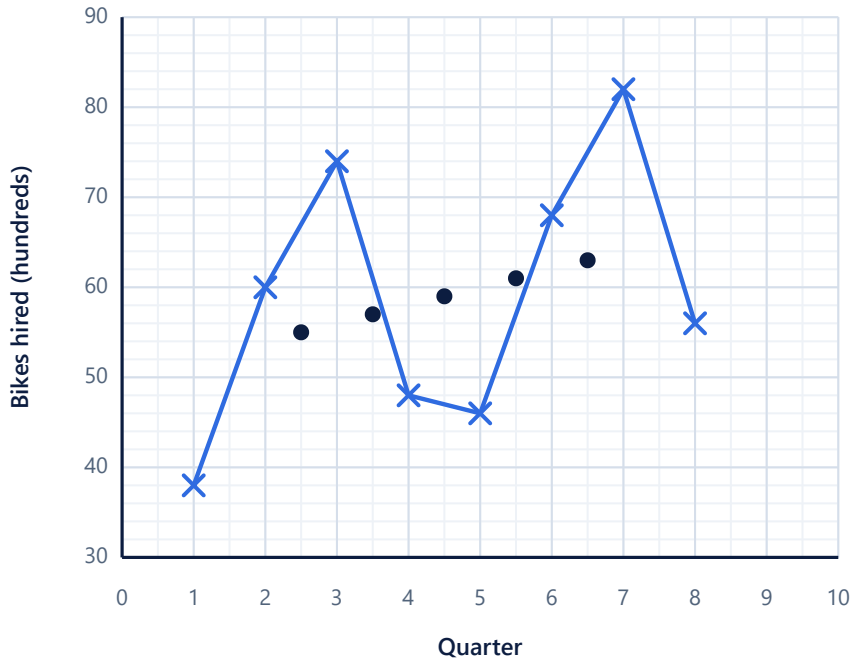
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3 A bike hire company records the number of bikes hired in each quarter of 2024 and 2025. Quarter 1 is January to March 2024. The graph shows the number of bikes hired, in hundreds, as crosses joined by lines. The 4-point moving averages are plotted as dots.

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

b. Use your trend line to find the trend value for quarter 9 (January to March 2026). (1)

c. The mean seasonal variation for the January to March quarter is −14 hundred. Predict the number of bikes hired in quarter 9. (2)



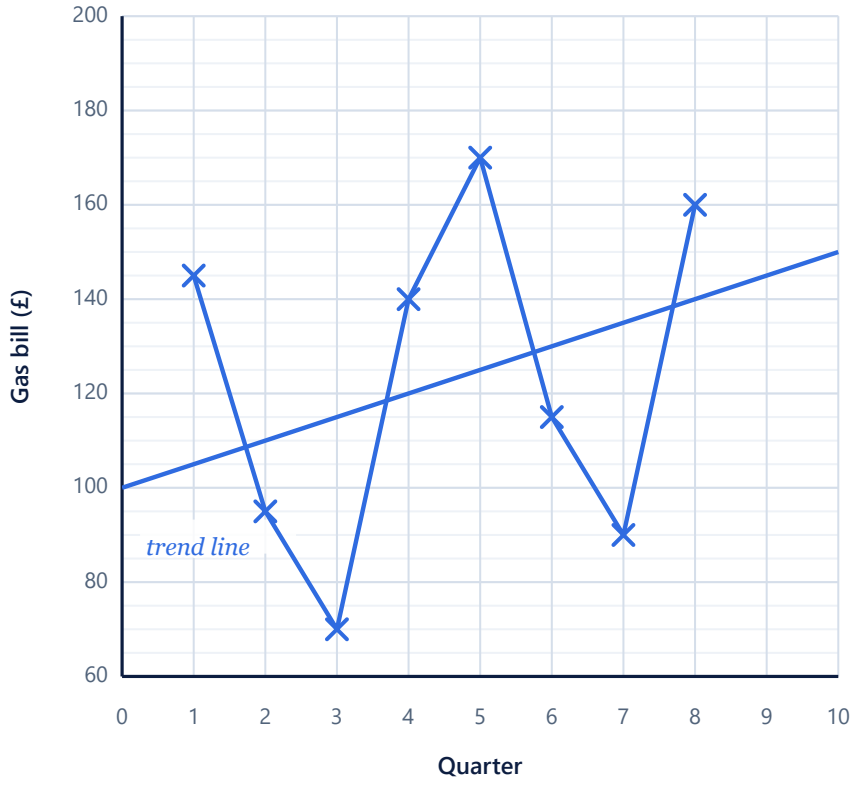
(4 marks)

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4 The time series graph shows a household's gas bill, in pounds, for 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. The gas bill for quarter 5 was £170. Work out the seasonal variation for quarter 5. (2)

b. The seasonal variation for quarter 1 was +£40. Work out the mean seasonal variation for the January to March quarter, and use it to predict the gas bill for quarter 9 (January to March 2026). (3)



(5 marks)

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5 A courier records the number of parcels it delivers each quarter. The table shows the seasonal variations, in thousands of parcels, for quarter 4 (October to December) of three years.

Year	2022	2023	2024
Seasonal variation for quarter 4	+21	+26	+25

a. Work out the mean seasonal variation for quarter 4. (2)

b. The trend value for quarter 4 of 2024 was 180 thousand parcels. The trend line rises by 3 thousand parcels every quarter. Predict the number of parcels delivered in quarter 4 of 2025. (2)

c. Explain why a prediction for quarter 4 of 2030 made in the same way would be less reliable. (1)

(5 marks)

End of questions | Total 21 marks

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