Time Series: Find the Structure

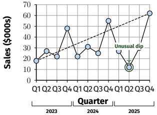
Key idea

A **time series** plots one variable in time order. Use **TSN**: Trend, Seasonality, Noise.

Read before analysing

Check the time interval, units and grouped years. Then describe only patterns supported by the plotted points.

One graph, three questions



T = Long-term Trend

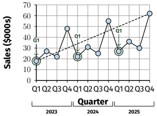
Key idea

Describe trend as **increasing**, **decreasing**, or **no clear trend**. Compare like periods across cycles.

Evidence

Q1 rises from 18 to 22 to 27, while Q4 rises from 48 to 55 to 62. This supports an **increasing trend**.

Look through the seasonal zig-zag



S = Repeating Seasonality

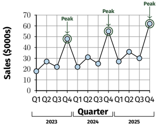
Key idea

Seasonality is a pattern that repeats after a fixed interval. State the **cycle length**, usual **peak**, and usual **trough**.

Evidence

The cycle repeats every four quarters. Q4 is the peak in all three years; Q1 is usually the trough.

Compare matching positions



N = Noise; Then Justify

Key idea

Noise is unusual variation that does not fit the trend or seasonal cycle. Compare it with what the pattern predicts.

Complete TSN statement

T: increasing. S: Q4 peaks yearly. N: 2025 Q2 $= 12$ is far below pattern; later points return to pattern.

The return to pattern matters