

Interpreting data from time series (TSN)



Read specific values off each graph, then quantify the Trend, Seasonality, or Noise you find.

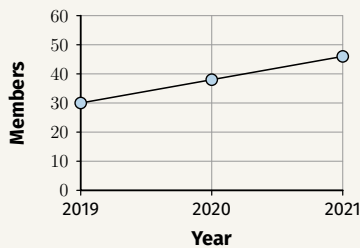
Name _____

Date _____

Reading a time series graph

A time series graph plots data against time. **Trend** is the long-term direction (increasing or decreasing) once you look past the small ups and downs. **Seasonality** is a pattern that repeats every fixed cycle (e.g. every 4 quarters). **Noise** is a one-off point that doesn't fit either pattern. Always back up your answer with the actual numbers from the graph.

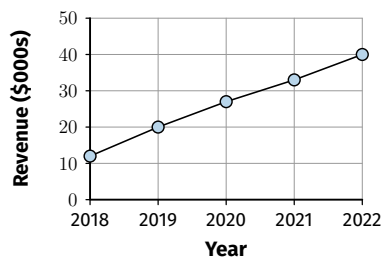
Worked example What was the membership in 2021, and by how much did it grow from 2019 to 2021?



Membership in 2021 was 46.
Growth from 2019 to 2021: $46 - 30 = 16$.

1. Describe the trend shown, and calculate the total increase in revenue from 2018 to 2022.

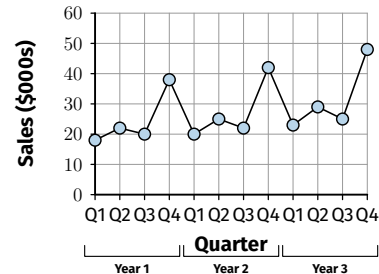
Solution: Increasing trend. Increase: $40 - 12 = 28$ (\$28,000).



Working

2. Which quarter is the seasonal peak each year? Which is the trough? How many quarters make up one full cycle?

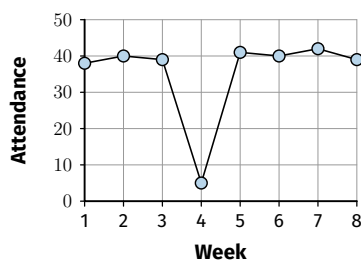
Solution: Peak: Q4 (38, 42, 48). Trough: Q1 (18, 20, 23). One full cycle is 4 quarters (1 year).



Working

3. Which week shows an unusual value that doesn't fit the pattern? Suggest a possible real-world cause.

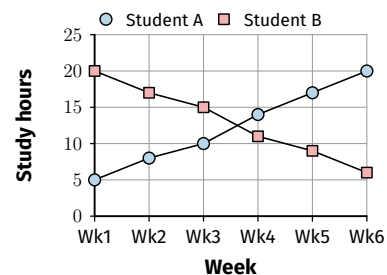
Solution: Week 4 (attendance 5) is noise – e.g. a snow day or public holiday closure.



Working

4. Compare the trend of Student A's study hours with Student B's.

Solution: Student A: increasing (5 up to 20 hours). Student B: decreasing (20 down to 6 hours) – opposite directions.



Working

Interpreting data from time series (TSN) (continued)



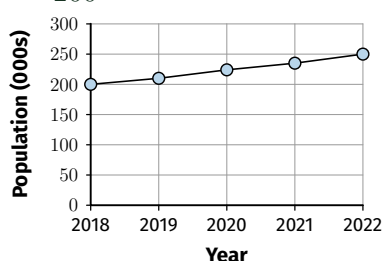
Read specific values off each graph, then quantify the Trend, Seasonality, or Noise you find.

Name _____

Date _____

5. Calculate the percentage increase in population from 2018 to 2022.

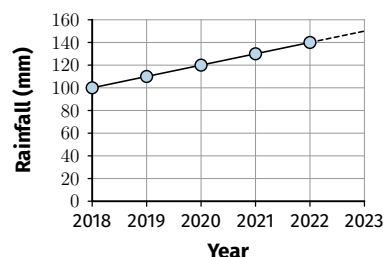
Solution: $\frac{250 - 200}{200} \times 100 = 25\%$.



Working

6. The dashed line shows the trend continuing. What value does it predict for 2023?

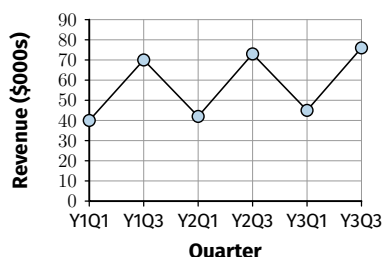
Solution: 150 mm.



Working

7. Compare only the Q1 values across the three years, then only the Q3 values. Is there an underlying trend, even though Q1 and Q3 are very different sizes each year?

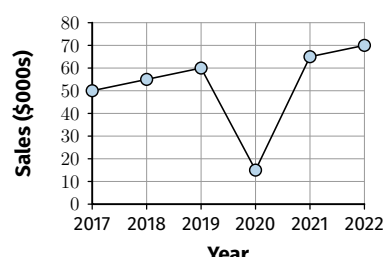
Solution: Q1 alone: 40, 42, 45 (increasing). Q3 alone: 70, 73, 76 (increasing). Yes – there is a genuine increasing trend in both, hidden by the large Q1/Q3 gap each year.



Working

8. Is the 2020 dip noise, or a genuine change in trend? Justify your answer using the 2021 and 2022 values.

Solution: Noise. The original pattern rises \$5,000 per year (50, 55, 60), and 2021 (65) and 2022 (70) continue exactly that pattern – so the 2020 dip to 15 was a one-off, not a lasting change.



Working