**Week** 10/11
**Term** 04
**2016**

# Learning Brief

**MA4 Statistics and Probability**

## Goals

"Data don't make any sense, we will have to resort to statistics."

This week we will continue to look at bivariate data

- time series and trend lines
- fitting trend lines and forecasting
- smoothing time series

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## Theoretical Components

Mathspace Lessons:
**WK10**:
Reading and Interpreting Time Series Graph:
https://goo.gl/0Brmpt
Smoothing Data with Moving Average
https://goo.gl/YVa5Zw

**WK11**:
Seasonal Indices:
https://goo.gl/aEAifx

This clip discusses patterns and trends in time series plots.

http://www.youtube.com/watch?v=ca0rDWo7IpI&feature=fvwrel

This clip shows 3-point smoothing – only watch the first 4 minutes of the clip.

http://www.youtube.com/watch?v=U0dF8uJs3mE

## Practical Components

These exercises are available on Google Classroom. Check **2016S2/WK10_11** folder:

- Reading and Interpreting Time Series Graph:
  **Do ALL.**
- Smoothing Data with Moving Average
  **Do ALL.**

## Investigation

See next page!

This investigation is due on the Friday of WK11. Late penalty (5% per day late) will apply!

## QFO

Quiz/Forum/Other

Complete the Mathspace activity on Time Series Data. Due on the Friday of WK11.

# Investigation

It is possible to seasonally adjust time series for other than the usual four seasons. A restaurant wishes to study its customer patterns on a daily basis. In this case a 'season' is a single day and there are 7 seasons in a weekly cycle (the restaurant is not open on Sunday). The data collected is shown in the table below and represents the revenue each day.

| Season | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 |
|---|---|---|---|---|---|
| Monday | 1036 | 1089 | 1064 | 1136 | 1042 |
| Tuesday | 1103 | 1046 | 1085 | 1207 | 1156 |
| Wednesday | 1450 | 1324 | 1487 | 1378 | 1408 |
| Thursday | 1645 | 1734 | 1790 | 1804 | 1789 |
| Friday | 2078 | 2204 | 2215 | 2184 | 2167 |
| Saturday | 2467 | 2478 | 2504 | 2526 | 2589 |

Use the spreadsheet "Seasonal Adjustment' (Check Google Classroom **2016S2/WK10_11** folder) to deseasonalise the data.
Print the spreadsheet along with the graph.
Does the deseasonalised data show a trend?
Use the equation of the linear regression line to predict revenue of Thursday of Week 6.
Hint There are 30 numbers (revenue) which explains the 1 to 30 on the graph. You will need to use a value of x greater than 30.
You will need to modify the spreadsheet by adding columns and rows. Make sure you copy the formulas into the new cells.