General Mathematics Unit 3

Sample application task – Data analysis, probability and statistics – Agricultural commodities

The application task is to be of 4–6 hours duration over a period of 1–2 weeks.

Introduction

The agricultural commodities sector is very important for the economy of developing countries around the world. Data describing Australian agriculture ([agriculture.gov.au/ag-farm-food](https://www.agriculture.gov.au/ag-farm-food)) and the agriculture for other countries around the world ([indexmundi.com/agriculture/](https://www.indexmundi.com/agriculture/)) will be used to investigate local and international commodities. In this task the commodity of wheat will be investigated locally, nationally and internationally.

For comparison purposes, some currencies may need to be converted. A list of exchange rates can be found at: [rba.gov.au/statistics/frequency/exchange-rates.html](https://www.rba.gov.au/statistics/frequency/exchange-rates.html).

Component 1

Choose an Australian state or territory (<http://apps.agriculture.gov.au/agsurf/agsurf.asp>) and randomly select a consecutive 10 year period for ‘wheat produced’.

1. Using an appropriate visual display and a set of summary values analyse this set of data.
2. Randomly choose another state or territory and data for the same consecutive 10 year period. Compare the information seen in this set of data with that found for the initially chosen state. Discuss any findings.
3. For the initially chosen state, collect data for the variable ‘wheat sold’. Create an appropriate data set using ‘wheat produced’ and ‘wheat sold’. Summarise this data and discuss any findings.

Component 2

1. Select ‘wheat production’ for Australia ([indexmundi.com/agriculture/](https://www.indexmundi.com/agriculture/)) for a consecutive period of   
   30 years.
2. Present the data in an appropriate time series display. Apply at least two smoothing techniques, discussing reasons for the choices, and comment on any findings.
3. Fit a trend line to the data. Use the trend line to predict and forecast appropriately chosen examples. Discuss any findings.
4. Examine the data for the appropriateness of fitting a transformed regression. Include two specific examples and discuss any findings.
5. Select a second sample of 30 consecutive years and compare to the original set. Include any differences, similarities and findings linked to predictions and forecasting.

Component 3

Choose two other countries to compare with the findings discussed for Australia.

1. Undertake a statistical analysis of each countries data. Include both visual and numerical summaries, including time series plots, and discuss the appropriateness of smoothing and transformations.
2. Use predictions and forecasting to discuss production estimates for 2030 for each of the chosen countries. Estimate the impact of these predictions on the economy of each country.

Areas of study

The following content from the areas of study is addressed through this task.

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| Area of study | Content dot point |
| AOS1 – Data analysis, probability and statistics  Investigating data distributions  Investigating associations between two variables  Investigating and modelling linear associations  Investigating and modelling time series data | 4, 5, 6  3, 4, 5, 6  1, 2, 3, 4, 5  1, 2, 3, 4, 5 |

Outcomes

The following outcomes, key knowledge and key skills are addressed through this task.

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| Outcome | Key knowledge dot point | Key skill dot point |
| 1 | 1, 4, 7, 8, 9, 10, 12, 13 | 3, 4, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17 |
| 2 | 1, 2, 3, 4, 5 | 1, 4 |
| 3 | 1, 2, 3, 4, 5, 7 | 1, 2, 3, 5, 6, 7, 9, 10, 11, 12 |