

Course name: Mathematical Applications (T)	Assessment Item (AI) name: Assessment Item 1 – Investigations + Assignment Term 3	Student name: Line:
Unit name: 14113 Unit 4 Mathematical Applications	Weighting: 20% (Weighted together with briefs)	Teacher name: Serene Findlay-Steele
Unit value: 1.0	Due date: Week 8-9 Exam Week (September 8 th – September 12 th)	Semester 1, 2022 Term 3
Length: 3 weeks	Conditions: Take home task	

Instructions for Assessment Item

See attached documentation/instructions

Assessment Criteria:

You will be assessed on the degree to which you demonstrate:

- Knowledge, application, reasoning and communication

See rubric/assessment guide attached for detailed assessment criteria

Declaration of Originality:

1. The content of this AI is my own work and is not copied from any other source either electronic or printed
2. The AI does not contain content written by any other person except where specifically authorised by my teacher(s)
3. I hold a complete copy of this assignment and source material

Student Signature:

If this task is submitted electronically, I certify that the above is true.

Teacher Copy

The assessment item was submitted toon

Teacher Signature:

Student Signature:

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Student Signature:

Task 1 (10 marks total, 2 marks each)

The following table shows the yearly sales for the top selling music album since 2002 (x 1000, e.g. 7608 = 7,608,000)

Year	Sales	Year	Sales	Year	Sales	Year	Sales
2002	7608	2007	3699	2012	4410	2017	1903
2003	6536	2008	2874	2013	2430	2018	1491
2004	7979	2009	3217	2014	3661	2019	1085
2005	4969	2010	3415	2015	7441	2020	1276
2006	3719	2011	5824	2016	1731	2021	1464

a) Construct a 3 point moving average for the table above.

b) Graph the original and smoothed data on the same axis (submit through google classroom)

c) Are there any notable points in the original data? What kind of trend is it?

d) How well does the smoothed data reflect the trends of the original data? What would be a good estimate for the value for 2024 using the last smoothed value?

e) Generate a linear regression equation trendline for the smoothed data and use it to predict the sales for 2030 (remember to change the years in your spreadsheet to years since 2001).

Task 2 (10 marks total, 2 marks each)

The following data shows total amount (in billions, e.g. 2.1 = \$2,100,000,000) of money made in sales by the video game industry for each quarter from 2015 to 2019.

	2015	2016	2017	2018	2019
Q1	2.1	2.6	3.0	3.1	3.1
Q2	1.9	1.8	1.9	2.3	2.3
Q3	2.3	1.9	2.5	3.0	3.0
Q4	6.6	5.8	6.9	6.2	6.2

a) What does the data suggest about the sale of video games throughout the year?

b) Deseasonalise the data.

	2015	2016	2017	2018	2019
Q1					
Q2					
Q3					
Q4					

c) Graph the seasonalised and deseasonalised data on the same axis (submit through Google Classroom)

d) According to the deseasonalised data, what was the most successful quarter throughout the 5 years?

e) Use the linear regression equation trend line of the deseasonalised data to predict the total sales value for Q4 2021, and reseasonalise the value. Compare this to the actual value of roughly 7.5 (billion).

Task 3 (10 marks total, 2 marks each)

Nero takes out a loan of \$300,000 to go towards purchasing her first home. She starts with monthly repayments of \$4,304.13 and the loan is due to run for 10 years at 12% p.a., interest debited monthly. However, after 4 year the interest rate falls to 9% p.a. and consequently the quarterly repayments fall to \$3968.46 to maintain the 10-year term.

1. What amount is still owing after 6 years?
2. What amount would have still been owing after 6 years if the rate had remained at 12% p.a.?
3. What would be the difference in interest charged after 6 years between the two scenarios?
4. What would be the total interest charged for the full repayment if the interest rate had not been changed?
5. What is the total interest charged given that the interest rate changed?

Task 4 (10 marks total)

Mathspace time!

There should be 4 Mathspace tasks available for the term by the time you receive this assignment.
Post your scores for each below:

Task 1:

Task 2:

Task 3:

Task 4: