

College ABCD

Assignment

Assessment Period:	2022 S2
Course:	ESSENTIAL MATHEMATICS
Unit:	Unit 2: Essential Mathematics (1.0)
Accreditation:	A
Weight:	25%
Maximum Mark:	79
Due Date:	01 Aug

Assessment Conditions

The task is to be completed in class and at home. It should be completed and submitted electronically no later than 3:30 PM on the due date, through the school LMS with the declaration of own work form attached.

Additional Information

Assessment Criteria

Students will be assessed on the degree to which they demonstrate

- *Concepts and Techniques* - knowledge of mathematical facts, techniques and formulae presented in the unit. Appropriate selection and application of mathematical skills in mathematical modelling and problem solving.
- *Reasoning and Communication* - ability to use reasoning to support solutions and conclusions. Interpretation and communication of mathematical ideas in a form appropriate for a given use or audience.

Student Feedback

Verbal and/or written feedback will be given within two weeks of submission

Instructions

- Write your name and your teacher's name on each page submitted.
- Answer all questions, labelling each clearly.
- Show all working, as part marks may be awarded, where sufficient demonstration of your understanding is evident.
- Leave answers in exact form unless otherwise stated.
- Write in blue or black pen only. Sketch all graphs using a pencil and a ruler, showing appropriate features.
- If your work is word processed, ensure correct mathematical notation is used e.g. MS equation editor

Other Applicable Policies

BSSS and School policies on academic integrity and on penalties for late submission, as noted on the unit outline, apply.

For penalties for late and non-submission of work

Review [BSSS Policy and Procedure Manual 4.3.10](#) for more details.

For academic integrity

Review [BSSS Policy and Procedure Manual 4.3.12](#) for more details.

Congratulations, you have received your first job after completing University working at Australian Aid, the Australian Agency for International Development. Your supervisor has tasked you with completing some data analysis to help the Agency to make decisions about where to send resources from the Australian Foreign Aid budget.

Your teacher will be assigning you one of a number of topics to research:

- 1) Health in children
- 2) Maternal Health
- 3) Health spending per person
- 4) Education for females
- 5) Education for males
- 6) Access to Internet
- 7) Access to basic water sanitation
- 8) Vaccination Rates

Once you have been assigned your area of research, you need to go to the Gapminder Website (<https://www.gapminder.org/data/>) and determine 1 data set that links to your area of research. You need to capture the most recent data possible that includes at least 70 data points.

Part 1: Project Proposal (10 marks)

You will need to submit a **Project Proposal**. This should include

- the data you are using for your analysis area
- what you expect your data to tell you
- what year you are collecting data from and
- how many countries you have data for.

RC12, RC2, RC5

Students asked to make a well-reasoned decision about what data will allow them to make a recommendation about an area for the public good.

Part 2: Data Analysis and Display (75 marks)

- You will need to complete a data analysis for all countries using a spreadsheet program (Excel or Google Sheets). Your Data Analysis must be submitted as a spreadsheet with all formulas able to be viewed by the teacher [for example =average(B2:B87)]

Data Analysis must contain:

- mean, standard deviation
- five-number summary (min, Q1, Q2, Q3, max)
- range and IQR
- any outliers
- You will then take all your data and break it down into 5 smaller geographical groups. [This website](#) will be helpful. Put each region on its own sheet in the Spreadsheet file.
 - African Countries
 - European Countries
 - Asian/Oceania Countries
 - American Countries (North, Central and South America)
 - Middle Eastern Countries
- Then complete your analysis again for each of these 5 regions.
- You will need to display your REGIONS data in the following graphs. These graphs need to be presented on either a Word or Google Document with clear labels for all graphs.
 - Grouped Frequency Histogram (5 Histograms needed with the same group sizes)
 - Stacked Box plot– draw a boxplot use <http://www.imathas.com/stattools/boxplot.html> (5 boxplots needed on the same scale)
- Using your data analysis and your graphs you then need to write a **REPORT** that describes the distribution, shape (skew), spread and any outliers of each REGION making reference to the statistical measures used, for example standard deviation, mean, IQR, Range, outliers. You are expected to communicate your analysis in written form which is succinct and well-reasoned, using appropriate and

CT1, CT2, CT4

Students asked to use data analysis concepts and techniques with a digital technology (spreadsheet package) to gather, analyse and display real world data.

accurate language. Your **report** should be between 200 and 300 words and submitted on either a Word or Google Doc.

Part 3: Conclusions and recommendations (20 marks)

- Did your data meet the expectations you indicated in your Project Proposal? Why or why not?
- How can your data analysis be used to help inform decision makers and provide knowledge for the public good? Use well-reasoned arguments with appropriate mathematical language.
- If you needed to decide how Australia would donate \$10 000 000 for the area of research you have been assigned, how would you recommend this money be apportioned by REGION? You should provide a well-reasoned justification for your recommendation.
- Evaluate how well you managed your time and resources. What would you do differently if you could?
- Your **Conclusion and recommendation** should be between 200 and 300 words and submitted on either a Word or Google Doc.

[Example Proposal Document](#)

[Example Analysis Spreadsheet](#)

[Example Data Displays, Report, Conclusions and recommendation, Reflection](#)

RC1, RC2, RC3, RC4, RC5
Students to use the data gathered in part 2 to communicate mathematical concepts and judgements to evaluate the potential of Mathematics to generate knowledge in the public good.
Students also asked to reflect on their own thinking, planning, time management and use of appropriate strategies to complete a multi-step mathematics investigation.

Project proposal	A grade response	B grade response	C grade response	D grade response	E grade response
<p>Area of study and data used to measure from Gapminder website.</p> <p>(5 marks)</p>	Clearly stated Area of Research and data you are using to measure this with a well-reasoned and succinct justification for why this measure will be appropriate for the area of research.	Area of research and data measurement stated. Clearly stated link between area of research and data used to measure with the use of clear, reasoned appropriate and accurate language.	Area of research and data measurement stated. Link between measurement data and area of research made using appropriate and accurate language.	Area of research and data measurement stated. Link between measurement data and area of research discussed with some appropriate language used.	Area of research and data measurement stated, no explanation of how this data can be used to measure the area of research.
<p>Expectation</p> <p>(5 marks)</p>	Clearly stated, well-reasoned and succinct justification for what you expect the results to show for ALL data and REGIONAL data with succinct, well-reasoned explanation for your reasoning	Justification for what you expect the results to show for ALL data and REGIONAL data using clear, reasoned, appropriate and accurate language.	Justification for what you expect the results to show for ALL data and REGIONAL data using appropriate and accurate language.	Expectation for ALL data and REGIONAL data provided with some justification using some appropriate language.	Expectation for ALL data and REGIONAL data provided without justification.

Data Analysis and Display	A grade response	B grade response	C grade response	D grade response	E grade response
<p>Data Analysis for data by REGION and for ALL data</p> <p>(25 marks)</p>	Selected and applied an appropriately efficient spreadsheet formula to find mean, standard deviation, 5 number summary values, IQR, range, outliers and clearly labelled analysis measures and formulas are able to be read.	Selected and applied an appropriately efficient spreadsheet formula to find mean, standard deviation, 5 number summary values, IQR, range, outliers. All formulas are able to be read.	Applied spreadsheet formula to find mean, standard deviation, 5 number summary values, IQR, range, outliers. All formulas are able to be read	Applied spreadsheet formula to find some of the measures of data analysis: mean, standard deviation, 5 number summary values, IQR, range, outliers. All formulas are able to be read.	Applied spreadsheet formula to find some of the measures of data analysis: mean, standard deviation, 5 number summary values, IQR, range, outliers.

Data Display-Histograms (15 marks)	Represented mathematical concepts in graphical form with clear titles and consistent group sizes for all 5 groups of REGIONAL data	Represented mathematical concepts in graphical form with consistent group sizes and titles for all 5 groups of REGIONAL data.	Represented mathematical concepts in graphical form and informative titles for all 5 groups of data.	Represented mathematical concepts in graphical form with titles for all 5 groups of data.	Represented mathematical concepts in graphical form for some of the REGIONAL data.
Data Display-Boxplot (15 marks)	Represented mathematical concepts in graphical form with clear titles and a shared scale for all 5 groups of REGIONAL data.	Represented mathematical concepts in graphical form with titles and a shared scale for all 5 groups of REGIONAL data.	Represented mathematical concepts in graphical form with informative titles for all 5 groups of REGIONAL data.	Represented mathematical concepts in graphical form with titles for all 5 groups of REGIONAL data.	Represented mathematical concepts in graphical form for some of the regional data.
Report (15 marks)	Communicates mathematical judgements and arguments in written form which is succinct and well-reasoned, using appropriate and accurate language and references to multiple statistical measurements as evidence.	Communicates mathematical judgements and arguments in written form, which is reasoned, using appropriate language and references to multiple statistical measurements as evidence.	Communicates mathematical judgements and arguments in written form using some appropriate language and references to some statistical measurements as evidence.	Communicates simple mathematical judgements in written form referencing some statistical measurements as evidence.	Communicates simple mathematical judgements in written form with limited use of appropriate language.

Conclusions and recommendations	A grade response	B grade response	C grade response	D grade response	E grade response
Use of data analysis (15 marks)	Succinctly used various mathematical calculations to communicate and evaluate the potential of Mathematics to make decisions for the public good.	Used various mathematical calculations to communicate and analyse the potential of Mathematics to make decisions for the public good.	Used some mathematical calculations to communicate and explain the potential of Mathematics to make decisions for the public good.	Used some mathematical calculations to communicate and describe the potential of Mathematics to make decisions for the public good.	Identified some ways in which Mathematics is used to generate knowledge for the public good.
Reflection	Reflected with	Reflected on	Reflected on	Reflected on	Reflected on

(5 marks)	insight on their own thinking and evaluated planning, time management and use of appropriate strategies to work independently.	their own thinking and analysed planning, time management and use of appropriate strategies to work independently.	their own thinking and explained planning, time management and use of appropriate strategies to work independently.	their own thinking with some reference to planning, time management and use of appropriate strategies to work independently.	their own thinking with little or no reference to planning, time management and use of appropriate strategies to work independently.
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