LUI | | | | | | | | | | | School code | | | | |

School name

Given name/s

Family name

Attach your barcode ID label here

Book of books used

External assessment 2023

Question and response book

General Mathematics

Paper 1

Time allowed

- Perusal time — 5 minutes
- Working time — 90 minutes

General instructions

- Answer all questions in this question and response book.
- QCAA-approved scientific calculator permitted.
- QCAA formula book provided.
- Planning paper will not be marked.

Section 1 (15 marks)

- 15 multiple choice questions

Section 2 (42 marks)

- 10 short response questions

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Queensland Government | QCAA Queensland Curriculum & Assessment Authority

DO NOT WRITE ON THIS PAGE

THIS PAGE WILL NOT BE MARKED

Section 1

Instructions

- This section has 15 questions and is worth 15 marks.
- Use a 2B pencil to fill in the A, B, C or D answer bubble completely.
- Choose the best answer for Questions 1–15.
- If you change your mind or make a mistake, use an eraser to remove your response and fill in the new answer bubble completely.

	A	B	C	D
Example:	●	○	○	○

	A	B	C	D
1.	○	○	○	○
2.	○	○	○	○
3.	○	○	○	○
4.	○	○	○	○
5.	○	○	○	○
6.	○	○	○	○
7.	○	○	○	○
8.	○	○	○	○
9.	○	○	○	○
10.	○	○	○	○
11.	○	○	○	○
12.	○	○	○	○
13.	○	○	○	○
14.	○	○	○	○
15.	○	○	○	○

Ensure you have filled an answer bubble for each question.

Do not write outside this box.

Section 2

Instructions

- Write using black or blue pen.
- Questions worth more than one mark require mathematical reasoning and/or working to be shown to support answers.
- If you need more space for a response, use the additional pages at the back of this book.
  - On the additional pages, write the question number you are responding to.
  - Cancel any incorrect response by ruling a single diagonal line through your work.
  - Write the page number of your alternative/additional response, i.e. See page …
  - If you do not do this, your original response will be marked.
- This section has 10 questions and is worth 42 marks.

QUESTION 16 (3 marks)

If it is 2:00 am local time in town A (30° N 90° W), calculate the local time in town B (26° S 120° E).

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QUESTION 17 (4 marks)

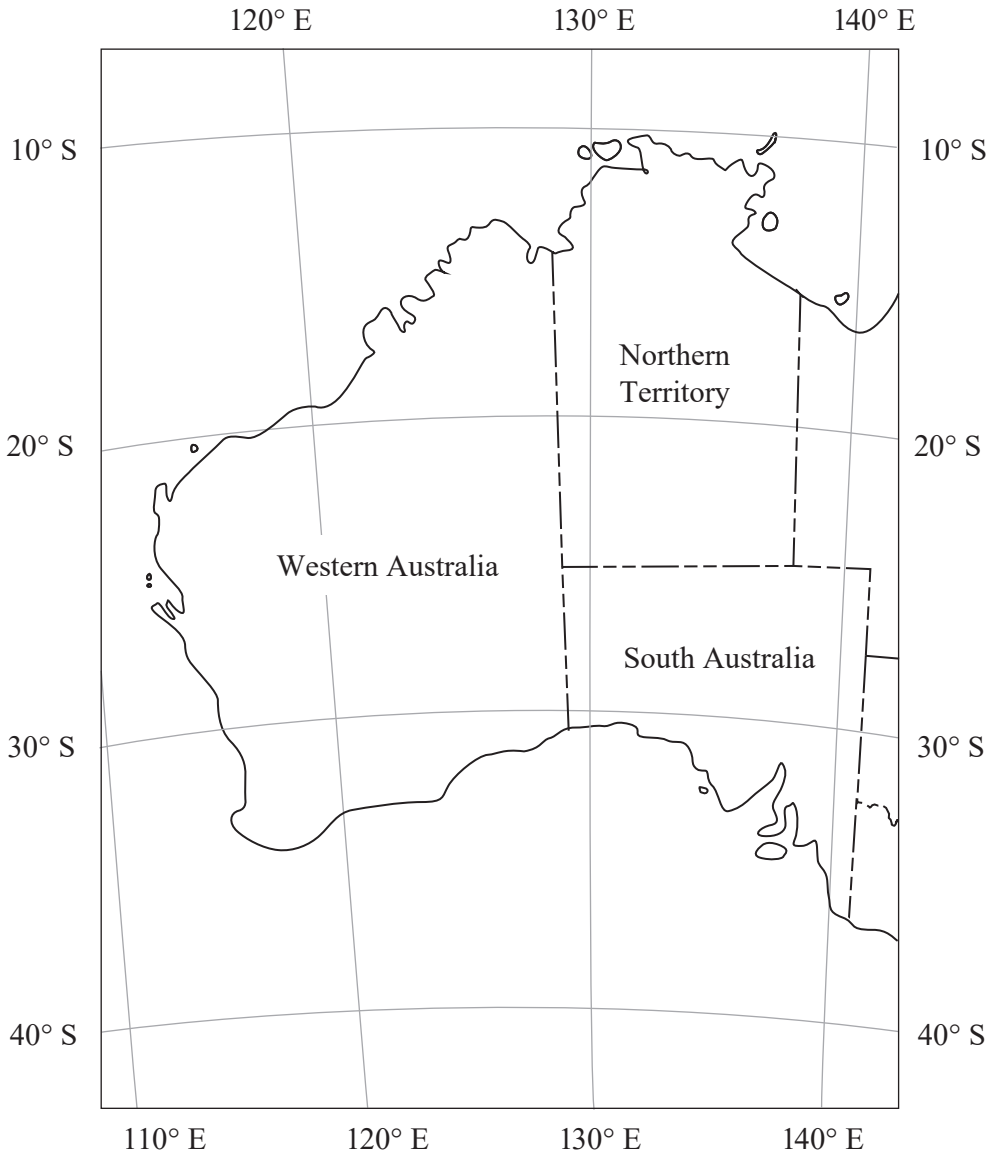
Terome paid a $50 000 deposit on a house valued at $570 000 and borrowed the remainder as a reducing balance loan at 6.6% p.a. compounding monthly. Determine the monthly repayment required to pay off the loan over 25 years.

Do not write outside this box.

QUESTION 18 (4 marks)

The locations of three space research sites in Australia are listed in the table.

Site	Coordinates
A	32° S 116° E
B	32° S 136° E
C	12° S 136° E



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a) Which site is closest to the equator? *[1 mark]*

b) Name the state or territory in which site A is located. *[1 mark]*

c) Determine and explain which two sites are in the same standard time zone. *[2 marks]*

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QUESTION 19 (4 marks)

Ngarra compares two investment options and decides option A will provide the better return.

- Option A: 5.60% p.a. compounding monthly
- Option B: 5.62% p.a. compounding quarterly

Use the effective annual rate of interest formula to evaluate the reasonableness of Ngarra's decision.

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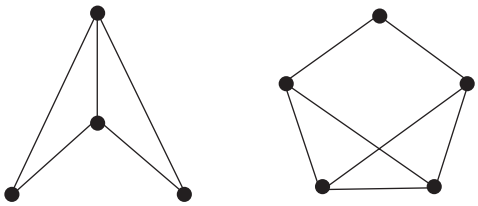
QUESTION 20 (4 marks)

Graphs 1 and 2 are shown.



1 2

a) Show that Euler's formula applies to graph 1. *[2 marks]*

b) What feature in the drawing should be changed to represent graph 2 as planar? *[1 mark]*

c) Redraw graph 2 to represent it as a planar graph. *[1 mark]*

Note: If you make a mistake in the diagram, cancel it by ruling a single diagonal line through your work and use the additional response space at the back of this question and response book.

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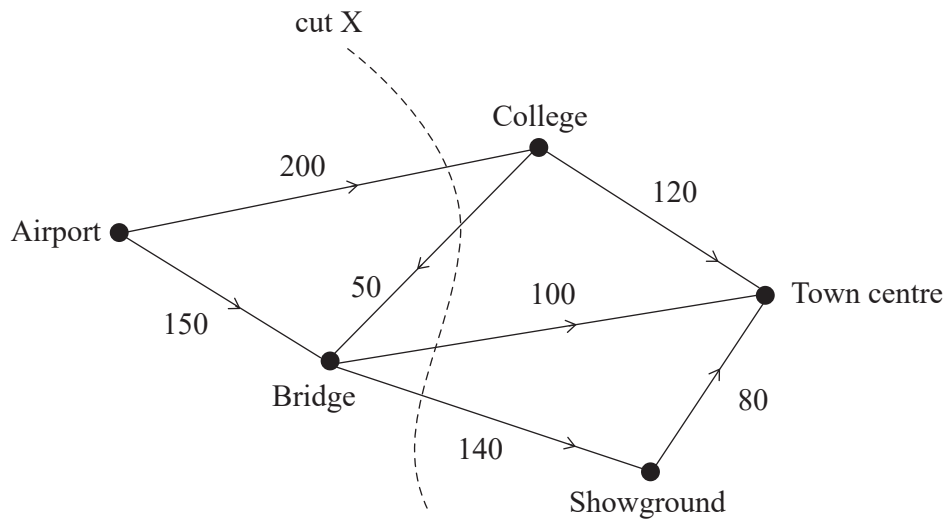
QUESTION 21 (4 marks)

The road network shows the number of vehicles per hour travelling from the airport to the town centre.



a) Determine the capacity of cut X. *[1 mark]*

b) Determine the maximum flow from the airport to the town centre. *[2 marks]*

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c) During a weather emergency, all roads to and from the bridge are closed to vehicles. Determine the maximum flow from the airport to the town centre during this time. *[1 mark]*

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QUESTION 22 (4 marks)

A person used a fitness tracker to monitor their hours of sleep and the distance they travelled each day.

Sleep (hours)	7	7.5	8	6.5	9.5	6	8.5
Distance (km)	5	7	5	7	4	8	6

a) Using distance as the response variable, display the data in a scatterplot with labelled axes. *[3 marks]*

Note: If you make a mistake in the scatterplot, cancel it by ruling a single diagonal line through your work and use the additional response space at the back of this question and response book.

b) Identify the direction of the association between hours of sleep and distance travelled. *[1 mark]*

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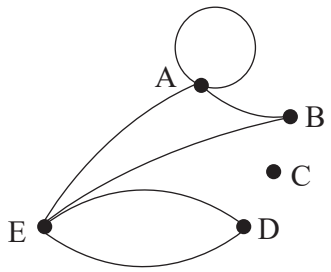
QUESTION 23 (5 marks)

A network graph is shown.



a) State the degree of vertex E. *[1 mark]*

b) State the number of edges joining D and E. *[1 mark]*

c) Construct an adjacency matrix from the graph with the vertices in alphabetical order. *[3 marks]*

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QUESTION 24 (5 marks)

Jed is preparing and serving a meal of curry and rice with naan bread. The table shows the duration and prerequisites for all the tasks they must complete.

Task	Task description	Duration (minutes)	Prerequisite
A	Assemble equipment	2	—
B	Boil rice	20	A
C	Prepare curry ingredients	6	A
D	Make naan bread	8	A
E	Simmer curry	40	C
F	Fry naan bread	4	D
G	Serve meal	2	B, E, F

a) Construct a network diagram to show the sequence of tasks from start to finish, labelling all tasks and durations. Use forward and backward scanning to show the earliest and latest starting times for all tasks. *[3 marks]*

Note: If you make a mistake in the diagram, cancel it by ruling a single diagonal line through your work and use the additional response space at the back of this question and response book.

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b) Determine the critical activities and minimum completion time for preparing and serving the meal. *[2 marks]*

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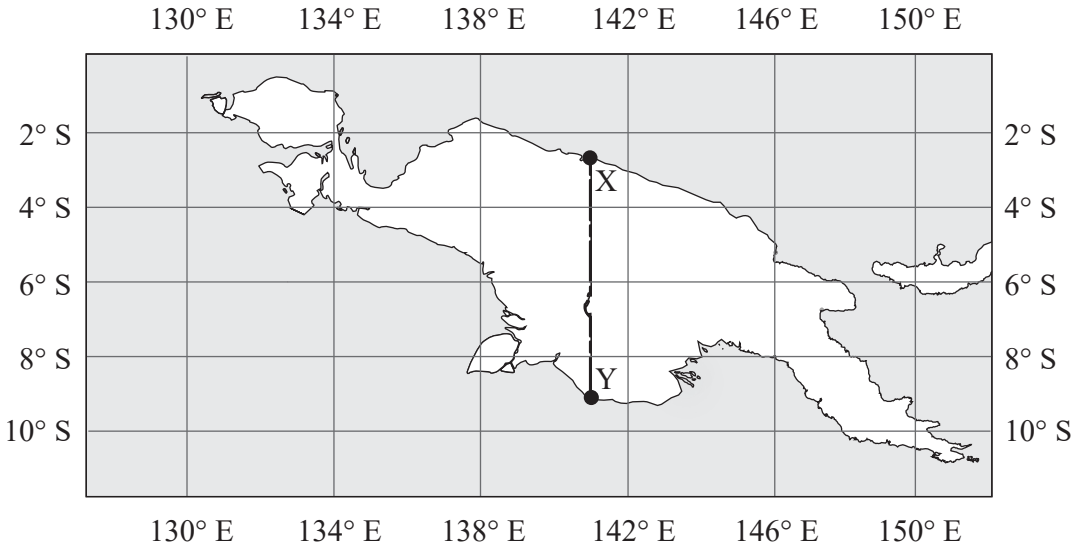
QUESTION 25 (5 marks)

The map shows a land border from X to Y.



a) State the latitude and longitude of X to the nearest degree. *[1 mark]*

b) State the latitude and longitude of Y to the nearest degree. *[1 mark]*

c) Calculate the distance between X and Y in kilometres. *[3 marks]*

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ADDITIONAL PAGE FOR STUDENT RESPONSES

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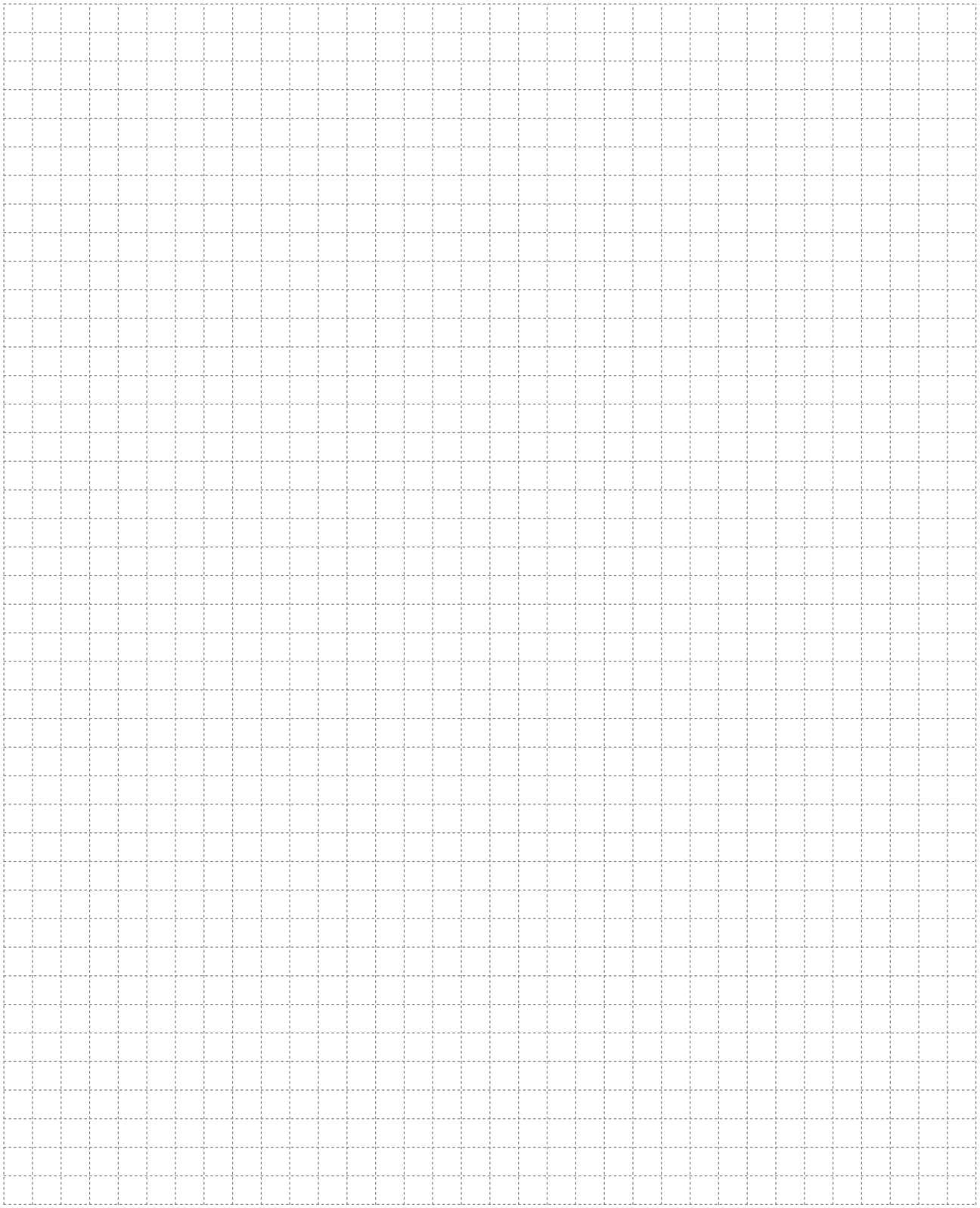

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