Given name/s

Family name

Teacher

Class

School name

Common internal assessment 2023 — Phase 3

Question and response book

Essential Mathematics

Time allowed

- Perusal time — 5 minutes
- Working time — 60 minutes

General instructions

- Answer all questions in this question and response book.
- Write using black or blue pen.
- QCAA-approved calculator permitted.
- Ruler required.
- QCAA formula book provided.
- Planning paper will not be marked.

Part A: Simple (40 marks)

- 9 short response questions

Part B: Complex (10 marks)

- 2 short response questions

Clear zone — margin trimmed off after completion of assessment

Queensland Government | QCAA Queensland Curriculum & Assessment Authority

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Instructions

- 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.

Part A: Simple

- This part has nine questions and is worth 40 marks.

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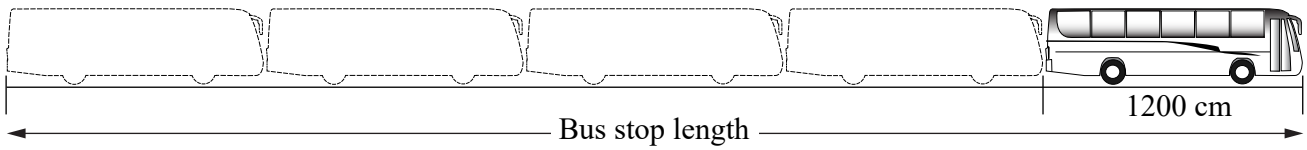
QUESTION 1 (3 marks)

A school is constructing a bus stop to accommodate five buses, as shown from the side view.



Not to scale

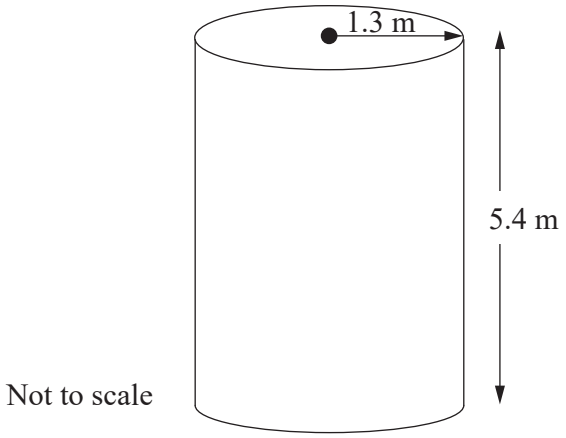
a) Estimate the minimum length of the bus stop in centimetres. *[2 marks]*

b) Convert the result from Question 1a) to metres. *[1 mark]*

Do not write outside this box.

QUESTION 2 (5 marks)

A cylindrical rainwater tank is installed at a property, as shown.



Not to scale

a) Calculate the volume of the rainwater tank. *[2 marks]*

b) Use the result from Question 2a) to determine the capacity of the rainwater tank in kilolitres. *[1 mark]*

c) Use the result from Question 2b) to calculate the number of tanks needed to collect 250 kL of rainwater. *[2 marks]*

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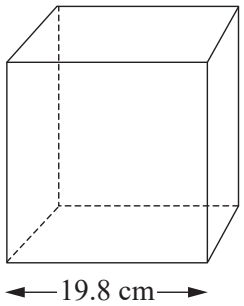
QUESTION 3 (3 marks)

A storage box is in the shape of a cube.

Not to scale



a) Round the side length of the storage box to the nearest centimetre. *[1 mark]*

b) Use the result from Question 3a) to estimate the area of one face of the storage box in square centimetres. *[1 mark]*

c) Use the result from Question 3b) to estimate the volume of the storage box in cubic centimetres. *[1 mark]*

Do not write outside this box.

QUESTION 4 (5 marks)

A person's body oxygen level test (BOLT) score measures the number of seconds a person lasts before feeling the need to take a breath. The five-number summary for individual scores in order is 26, 27, 30, 34 and 45.

a) Use the five-number summary to construct a box plot. *[3 marks]*

Draw your box plot here.

Note: If you make a mistake in the box plot, 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) Describe the spread of the box plot for the BOLT scores. *[2 marks]*

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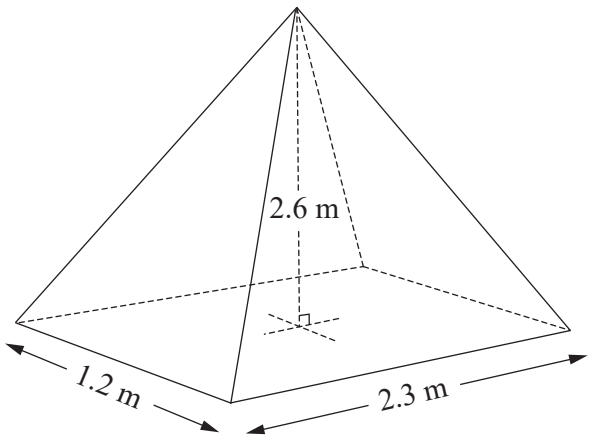
QUESTION 5 (5 marks)

A glass pyramid is filled with coloured liquid as a prop for a play.



Not to scale

a) Calculate the volume of the pyramid in cubic metres. *[2 marks]*

b) Use the result from Question 5a) to calculate the capacity of the pyramid in litres. *[2 marks]*

It is known that 1 L of coloured liquid has an estimated mass of 0.9 kg.

c) Use the result from Question 5b) to estimate the mass, in kilograms, of coloured liquid needed to fill the pyramid. *[1 mark]*

Do not write outside this box.

QUESTION 6 (4 marks)

A coach recorded the heights of a Year 5 class in centimetres and displayed the results in the table.

125	98	102	100	120	103	118	110	120	125

Complete the five-number summary for the heights by writing an appropriate label or value in each empty cell of the table.

Minimum		Median	Upper quartile (Q_3)	
	102		120	

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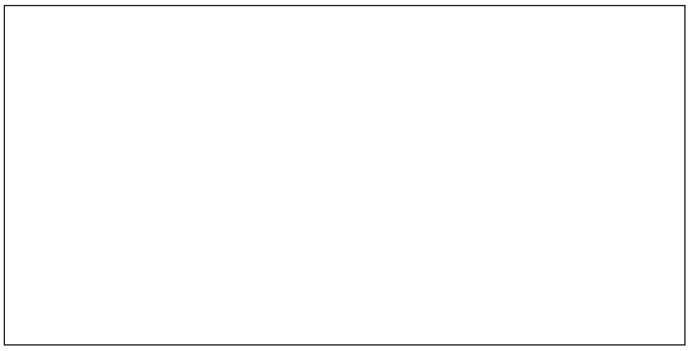
QUESTION 7 (5 marks)

A school built the rectangular volleyball court shown.



Scale 1:200

a) Calculate the actual length and width of the volleyball court in centimetres. *[3 marks]*

Length: _____

Width: _____

b) Use the results from Question 7a) to calculate the perimeter of the volleyball court in metres. *[2 marks]*

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QUESTION 8 (4 marks)

A survey revealed the annual amount of money students saved in dollars.

500	500	750	750	1000	1250	1250	1500	1500	1750	1750	1750	2250

a) Determine the modal amount of money saved. *[1 mark]*

b) Calculate the mean amount of money saved. *[2 marks]*

The company running the survey claims that the mean amount of money saved is greater than the modal amount of money saved.

c) Use the results from Questions 8a) and 8b) to evaluate the reasonableness of their claim. *[1 mark]*

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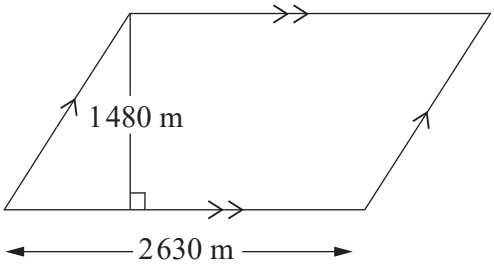
QUESTION 9 (6 marks)

A farmer is planting crops in the paddock shown.

Not to scale



a) Identify the name of the two-dimensional shape. *[1 mark]*

b) How many vertices does the paddock have? *[1 mark]*

c) Calculate the area of the paddock in square metres. *[2 marks]*

d) Convert the result from Question 9c) to hectares. *[2 marks]*

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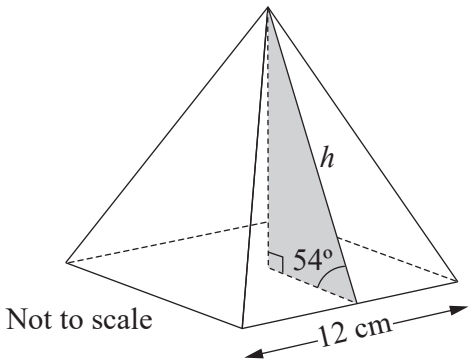
Part B: Complex

- This part has two questions and is worth 10 marks.

QUESTION 10 (5 marks)

A student created a cardboard model of a square-based pyramid as shown.



a) Use trigonometry to calculate the slant height, h, of the triangular face in centimetres. *[2 marks]*

b) Use the result from Question 10a) to calculate the total surface area of the model in square centimetres. *[3 marks]*

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QUESTION 11 (5 marks)

A teacher claims that, on average, students in their Year 12 class are taller than students in their Year 11 class.

The data for the student heights is displayed in the back-to-back stem-and-leaf plot.

Leaf: Year 12 class	Stem	Leaf: Year 11 class
	16	7 9
9 6 5 3 3 2 2 1 0	17	0 1 3 3 6 8
7 1	18	1 1
	19	7

Key: 17 | 6 = 176 cm

Investigate the suitability of using measures of central tendencies, excluding the mode, to evaluate the reasonableness of the teacher's claim. Justify your decision using mathematical reasoning.

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END OF PAPER

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ADDITIONAL PAGE FOR STUDENT RESPONSES

Write the question number you are responding to.

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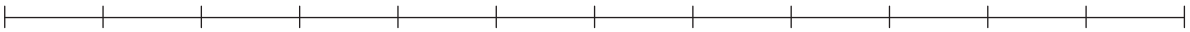
If you want this box plot to be marked, rule a single diagonal line through your original response.

Draw your box plot here.



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Instrument-specific standards — Common internal assessment

Foundational knowledge and problem solving	Cut-off (marks)	Grades
The student work has the following characteristics		
• comprehensive selection, recall and use of simple and complex facts, rules, definitions and procedures; comprehension and clear communication of simple and complex mathematical concepts and techniques; evaluation of the reasonableness of solutions and use of mathematical reasoning to justify procedures and decisions; and proficient application of simple and complex mathematical concepts and techniques to solve problems	> 40	**A**
• selection, recall and use of simple and some complex facts, rules, definitions and procedures; comprehension and communication of simple and some complex mathematical concepts and techniques; evaluation of the reasonableness of some solutions using mathematical reasoning; and application of simple and some complex mathematical concepts and techniques to solve problems	> 30	**B**
• selection, recall and use of simple facts, rules, definitions and procedures; comprehension and communication of simple mathematical concepts and techniques; discussion of the reasonableness of solutions using mathematical reasoning; and application of simple mathematical concepts and techniques to solve problems	> 20	**C**
• some selection, recall and use of facts, rules, definitions and procedures; basic comprehension and communication of mathematical concepts and techniques; some discussion of the reasonableness of solutions; and inconsistent application of mathematical concepts and techniques	> 10	**D**
• isolated and inaccurate selection, recall and use of facts, rules, definitions and procedures; disjointed and unclear communication of mathematical concepts and techniques; superficial discussion of the reasonableness of solutions.	≥ 0	**E**