Given name/s

Family name

Teacher

Class

School name

Common internal assessment 2023 — Phase 1

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

DO NOT WRITE ON THIS PAGE

THIS PAGE WILL NOT BE MARKED

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.

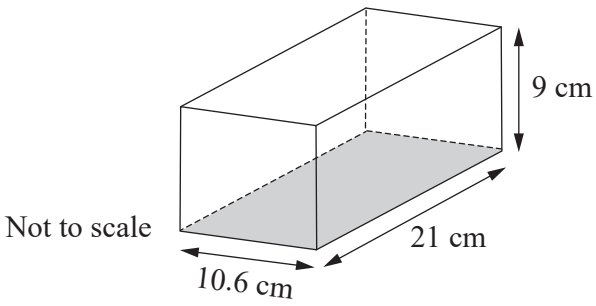
DO NOT WRITE ON THIS PAGE

THIS PAGE WILL NOT BE MARKED

Do not write outside this box.

QUESTION 1 (3 marks)

A tissue box is shown.



a) Round the width of the shaded base to the nearest centimetre. *[1 mark]*

b) Use the result from Question 1a) to estimate the area of the base in square centimetres. *[1 mark]*

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

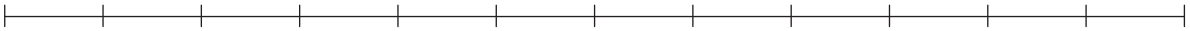
Do not write outside this box.

QUESTION 2 (5 marks)

Students were surveyed about the number of hours they spent on social media each day. The five-number summary in order is 2, 3, 4, 5 and 12.

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

Draw your box plot here.



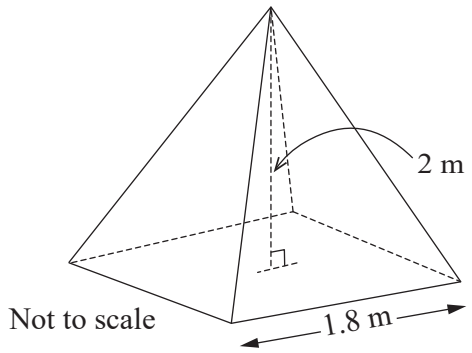
Note: If you make a mistake in the box plot, cancel it by ruling a single diagonal line through your work and use the additional response space at the back of this question and response book.

b) Describe the spread of the box plot for the number of hours spent on social media each day. *[2 marks]*

Do not write outside this box.

QUESTION 3 (5 marks)

A square-based pyramid is completely filled with coloured gel to use as a decoration.



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

b) Use the result from Question 3a) to calculate the capacity of the pyramid in litres. *[2 marks]*

It is known that 1 L of coloured gel has an estimated mass of 1.3 kg.

c) Use the result from Question 3b) to estimate the mass, in kilograms, of coloured gel needed to fill the pyramid. *[1 mark]*

Do not write outside this box.

QUESTION 4 (4 marks)

Students were surveyed to determine how much money they spent on lunch each week. The table shows the amounts rounded to the nearest dollar.

8	12	23	36	25	50	42	23	20	45	12

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

Minimum	Lower quartile (Q_1)			Maximum
	12		42	

Do not write outside this box.

QUESTION 5 (5 marks)

A rectangular outdoor eating space is shown.

Scale 1:80

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

Length: _____

Width: _____

b) Use the results from Question 5a) to calculate the perimeter of the eating space in metres. *[2 marks]*

Do not write outside this box.

QUESTION 6 (4 marks)

Students who walk to school were given a step counter to record their daily steps from home to school, as shown.

240	525	580	621	777	840	855	900	906	1020	1020

a) Determine the modal number of steps. *[1 mark]*

b) Calculate the mean number of steps, rounded to the nearest whole number. *[2 marks]*

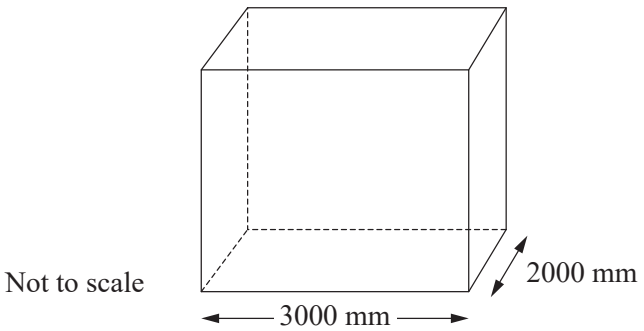
The school principal claims that the modal number of steps is greater than the mean number of steps.

c) Use the results from Questions 6a) and 6b) to evaluate the reasonableness of their claim. *[1 mark]*

Do not write outside this box.

QUESTION 7 (6 marks)

A carpenter is building a cabinet with the base dimensions shown.



a) Identify the name of the three-dimensional solid. *[1 mark]*

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

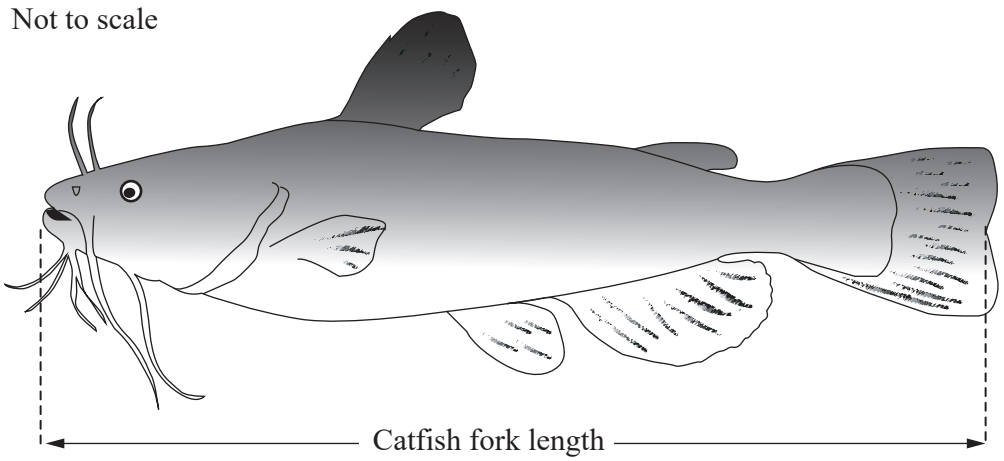
c) Calculate the base area of the cabinet in square millimetres. *[2 marks]*

d) Convert the result from Question 7c) to square metres. *[2 marks]*

Do not write outside this box.

QUESTION 8 (3 marks)

The fork length of a fish is measured from the tip of its snout to the fork of its tail. An average goldfish's fork length is 18 cm. An average catfish's fork length is 13 times that of a goldfish.



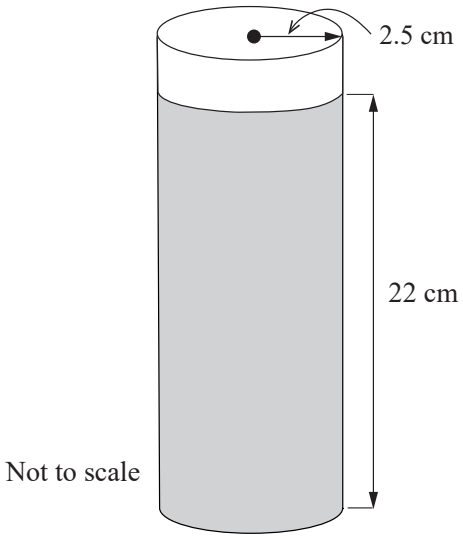
a) Estimate the average catfish fork length in centimetres. *[2 marks]*

b) Convert the result from Question 8a) to metres. *[1 mark]*

Do not write outside this box.

QUESTION 9 (5 marks)

A student purchased a cylindrical water bottle as shown.



a) Calculate the volume of the water bottle. *[2 marks]*

b) Use the result from Question 9a) to determine the capacity of the water bottle in millilitres. *[1 mark]*

c) Use the result from Question 9b) to calculate the number of times the bottle is filled if the student needs to drink 2500 mL of water. *[2 marks]*

Do not write outside this box.

DO NOT WRITE ON THIS PAGE

THIS PAGE WILL NOT BE MARKED

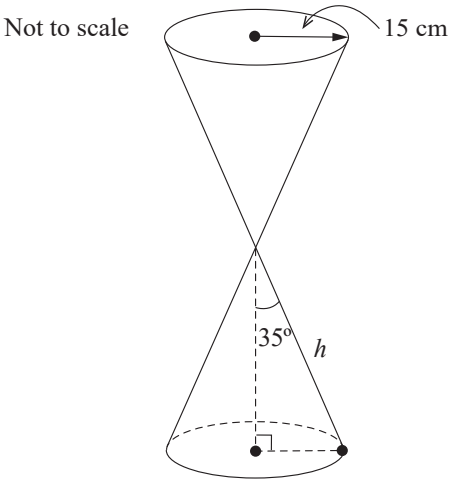
CONTINUE TO THE NEXT PAGE

Part B: Complex

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

QUESTION 10 (5 marks)

An hourglass is constructed from two identical enclosed glass cones, as shown.



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

Do not write outside this box.

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

Do not write outside this box.

QUESTION 11 (5 marks)

A film critic claims that sequels earn more opening weekend income, on average, than the original movies.

Frequency table 1 shows the total opening weekend income, in millions of dollars ($m), for recent original movies in a series.

Original movies	
Total opening weekend income ($m)	Frequency
100	2
110	1
120	2
130	2
140	2
150	2

Frequency table 2 shows the total opening weekend income, in millions of dollars ($m), for recent sequels in a series.

Sequels	
Total opening weekend income ($m)	Frequency
110	2
120	2
130	2
140	3
150	2

Use two suitable measures of central tendency to evaluate the reasonableness of the critic's claim. Justify your decision using mathematical reasoning.

Do not write outside this box.

END OF PAPER

Do not write outside this box.

ADDITIONAL PAGE FOR STUDENT RESPONSES

Write the question number you are responding to.

Do not write outside this box.

ADDITIONAL PAGE FOR STUDENT RESPONSES

Write the question number you are responding to.

Do not write outside this box.

ADDITIONAL PAGE FOR STUDENT RESPONSES

Write the question number you are responding to.

Do not write outside this box.

ADDITIONAL PAGE FOR STUDENT RESPONSES

Write the question number you are responding to.

Do not write outside this box.

ADDITIONAL PAGE FOR STUDENT RESPONSES

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

Draw your box plot here.

Do not write outside this box.

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**

References

Question 8

US Fish and Wildlife Service 2006, *Drawing of a Black Bullhead,* https://commons.wikimedia.org/wiki/File:Ameiurus_melas_by_Duane_Raver.png. Public Domain