Given name/s

Family name

Teacher

Class

School name

Common internal assessment 2023 — Phase 2

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 (4 marks)

The table shows the jump heights, in centimetres, of a Year 11 class.

29	22	29	49	30	36	47	37	38	41	45	42	45	41	37

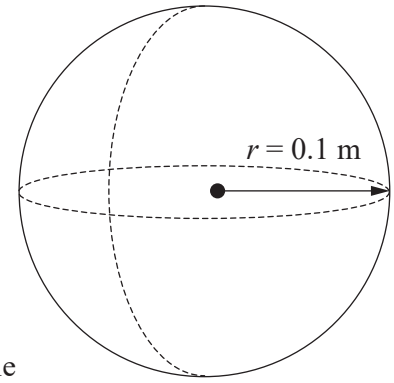
Complete the five-number summary for the jump heights by writing an appropriate label or value in each empty cell of the table.

	Lower quartile (Q_1)	Median		Maximum
	30		45	

Do not write outside this box.

QUESTION 2 (5 marks)

A gym owner buys a ball completely filled with gel.



Not to scale

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

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

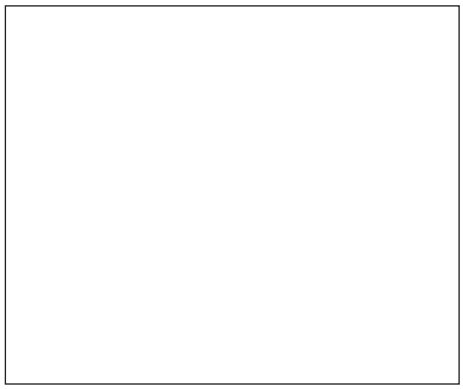
It is known that 1 L of gel has an estimated mass of 1.1 kg.

c) Use the result from Question 2b) to estimate the mass, in kilograms, of gel needed to fill the ball. *[1 mark]*

Do not write outside this box.

QUESTION 3 (5 marks)

A fence has been built around a piece of land, as shown.



Scale 1 cm : 1500 m

a) Calculate the actual length and width of the fence in metres. *[3 marks]*

Length: _____

Width: _____

b) Use the results from Question 3a) to calculate the perimeter of the fence in kilometres. *[2 marks]*

Do not write outside this box.

QUESTION 4 (4 marks)

Twelve senior students were surveyed about the amount of money, in dollars, they planned to spend on their end-of-school celebrations, as shown.

450	450	700	1000	1000	1000	1200	1500	1500	1800	2000	2500

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

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

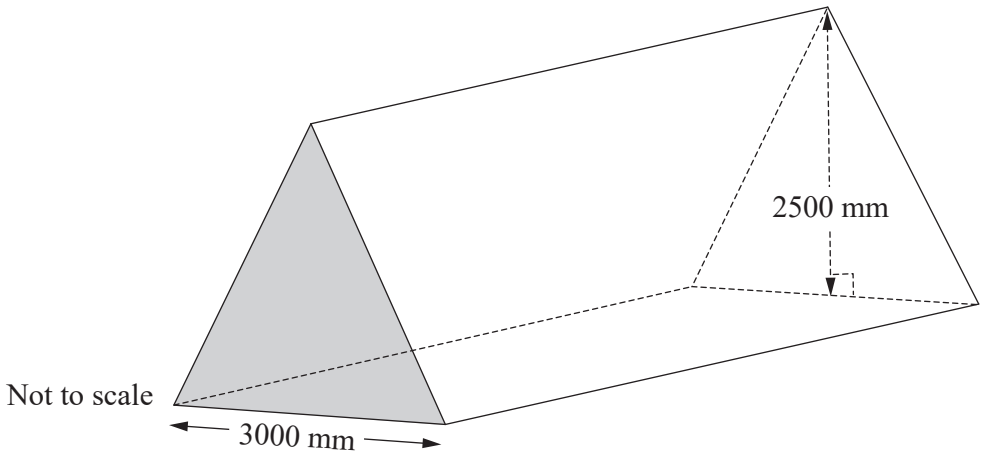
A student claims that the mean amount of spending money would be less than the modal amount of spending money.

c) Use the results from Questions 4a) and 4b) to evaluate the reasonableness of their claim. *[1 mark]*

Do not write outside this box.

QUESTION 5 (6 marks)

The roof of a shed is shown.



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

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

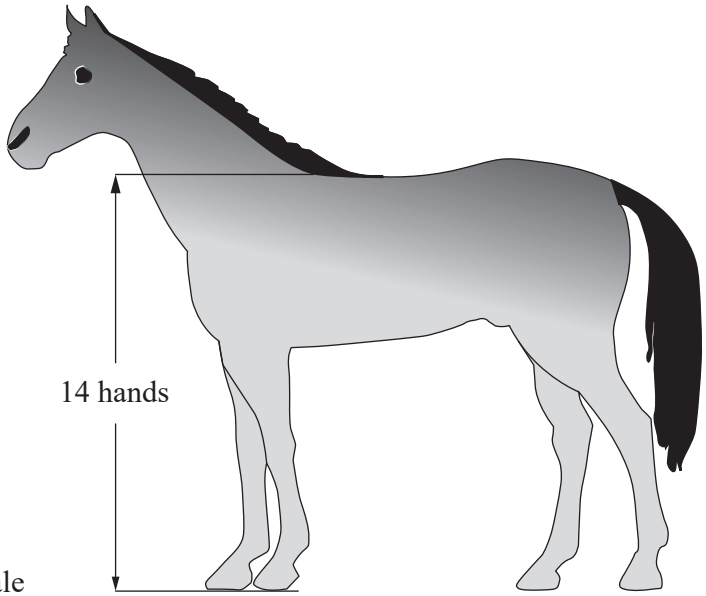
c) Calculate the area of the shaded face in square millimetres. *[2 marks]*

d) Convert the result from Question 5c) to square metres. *[2 marks]*

Do not write outside this box.

QUESTION 6 (3 marks)

Horse heights are measured from hoof to wither (where the neck meets the back) in units called 'hands'. A hand is approximately 10.2 cm.



Not to scale

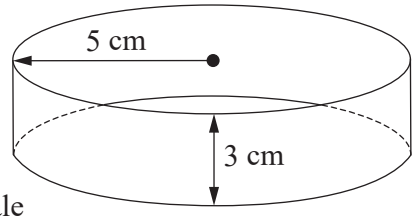
a) Estimate the height of the horse shown in centimetres. *[2 marks]*

b) Convert the result from Question 6a) to metres. *[1 mark]*

Do not write outside this box.

QUESTION 7 (5 marks)

The space within a pie shell is cylindrical, as shown.



Not to scale

a) Calculate the volume of the space within the pie shell. *[2 marks]*

The pie shell will be filled with custard.

b) Use the result from Question 7a) to determine the amount of custard, in millilitres, required to fill the pie shell. *[1 mark]*

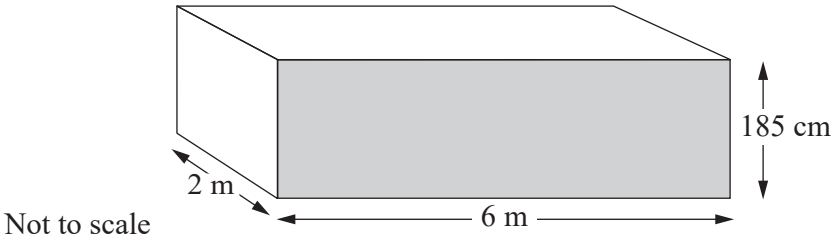
Custard is sold in 900 mL cartons.

c) Use the result from Question 7b) to calculate the number of pie shells that could be filled with one carton of custard. *[2 marks]*

Do not write outside this box.

QUESTION 8 (3 marks)

The local council is planning to install a long rectangular hedge in one of its parks, as shown.



Not to scale

a) Round the height of the hedge to the nearest whole metre. *[1 mark]*

b) Use the result from Question 8a) to estimate the area of the shaded face in square metres. *[1 mark]*

c) Use the result from Question 8b) to estimate the volume of the hedge in cubic metres. *[1 mark]*

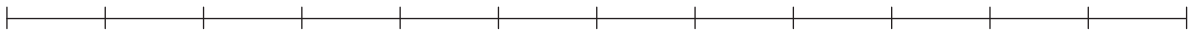
Do not write outside this box.

QUESTION 9 (5 marks)

A personal trainer collected their daily exercise times from last week. The five-number summary in order is 30, 72, 76, 80 and 85.

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 personal trainer's exercise times last week. *[2 marks]*

Do not write outside this box.

DO NOT WRITE ON THIS PAGE
THIS PAGE WILL NOT BE MARKED

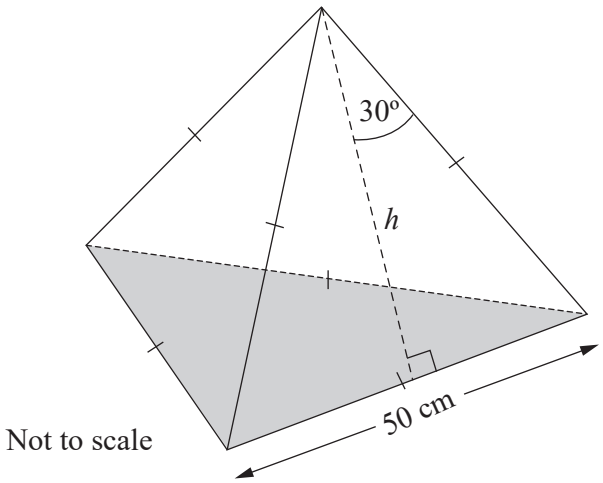
CONTINUE TO THE NEXT PAGE

Part B: Complex

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

QUESTION 10 (5 marks)

A paper pyramid is made up of four equilateral triangles, as shown.



Not to scale

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

Do not write outside this box.

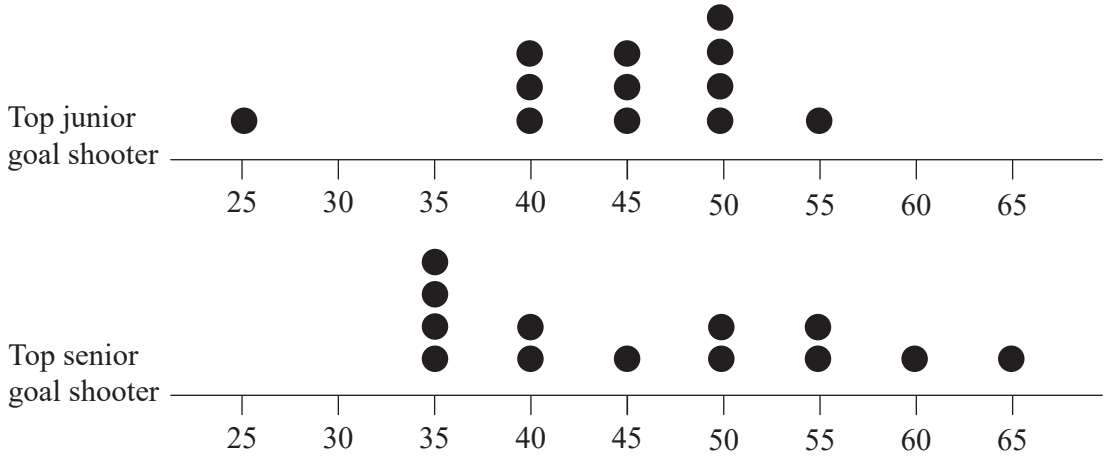
b) Use the result from Question 10a) to calculate the total surface area of the pyramid in square centimetres. *[3 marks]*

Do not write outside this box.

QUESTION 11 (5 marks)

A netball coach claims that the average weekly number of points scored by the top goal shooter on the junior team will be less than the average weekly number of points scored by the top goal shooter on the senior team.

At the end of the season, the data for the top goal shooters is collected as shown.



Investigate the suitability of using measures of central tendencies, excluding the mode, to evaluate the reasonableness of the coach'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 box plot 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 6

Modified from WikipedianProlific Horse anatomy 2008, https://commons.wikimedia.org/wiki/File:Horseanatomy.png. Creative Commons Attribution-Share Alike 3.0 Unported