

Given name/s

Family name

Teacher

Class

School name

Common internal assessment 2021

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





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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.
-

QUESTION 1 (2 marks)

One apple contains approximately 9 milligrams (mg) of magnesium. The recommended daily allowance (RDA) of magnesium for teenagers is 240 milligrams (mg).

Approximately what percentage of the RDA of magnesium for teenagers is contained in one apple?

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QUESTION 2 (5 marks)

A landscaper is loading a trailer with mulch. The trailer is in the shape of a rectangular prism with the internal dimensions shown.

Stimulus redacted.

Not to scale

- a) Use leading-digit approximation to estimate the volume of the trailer in cubic metres (m^3). [2 marks]

Three quarters of the trailer is loaded with mulch.

- b) Use the result from Question 2a) to determine the volume of mulch in the trailer in cubic metres (m^3). [1 mark]

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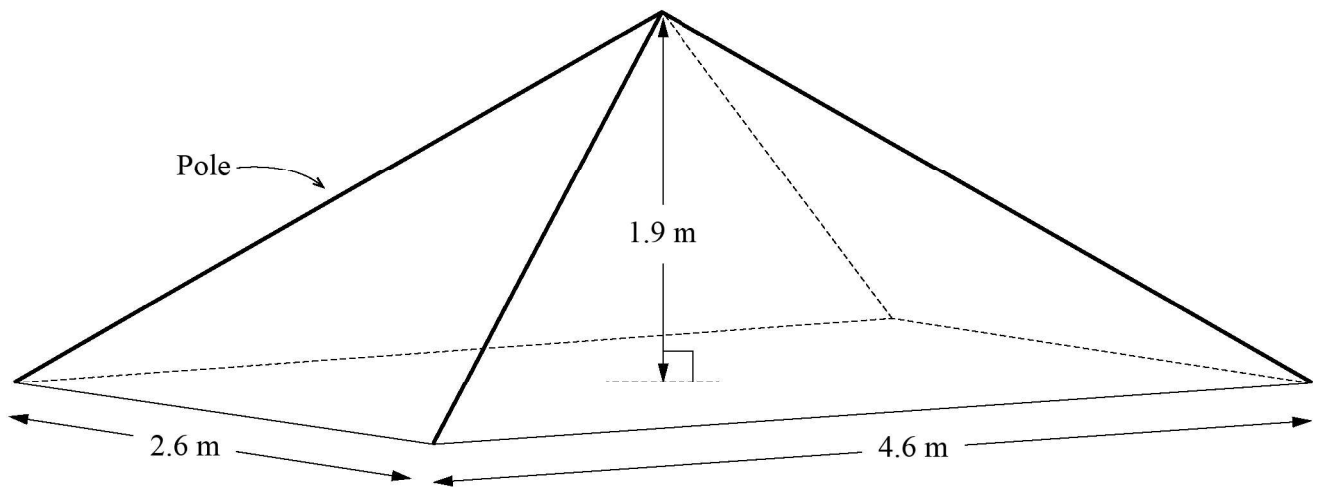
Towing specifications for the trailer state that the mass of a load must not exceed 450 kilograms (kg). The mulch weighs approximately 340 kilograms per cubic metre (kg/m^3).

- c) Use the result from Question 2b) to determine if the mass of mulch in the trailer is within towing specifications. *[2 marks]*

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QUESTION 3 (5 marks)

A tent in the shape of a rectangular-based pyramid is supported by four poles that meet at the top point of the tent, as shown.



Not to scale

- a) State the mathematical name given to the top point of the tent.

[1 mark]

The length of each pole is 325 centimetres (cm).

- b) Determine the total length of the four poles supporting the tent in metres (m).

[2 marks]

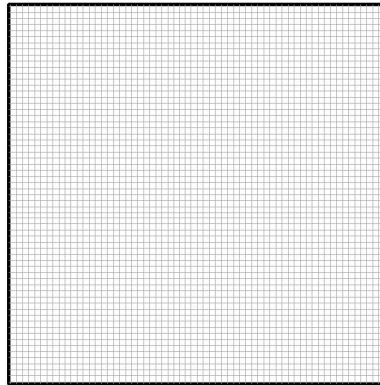
- c) Calculate the volume of the tent in cubic metres (m^3).

[2 marks]

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QUESTION 4 (5 marks)

A square window is to be fitted with an insect screen as shown in the scale diagram.



Scale 1:30

- a) Determine the actual side length of the square window in metres (m). [3 marks]

A square piece of mesh with an area of 2 square metres (m^2) is available to make the insect screen.

- b) Use the result from Question 4a) to determine if the square piece of mesh will fit the square window. [2 marks]

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QUESTION 5 (5 marks)

A rectangular TV screen has a height of 95 centimetres (cm) and a diagonal length of 152 centimetres (cm).

- a) Sketch a two-dimensional representation of the TV screen, labelled with the measurements converted to metres (m). The sketch does not need to be to scale. *[2 marks]*



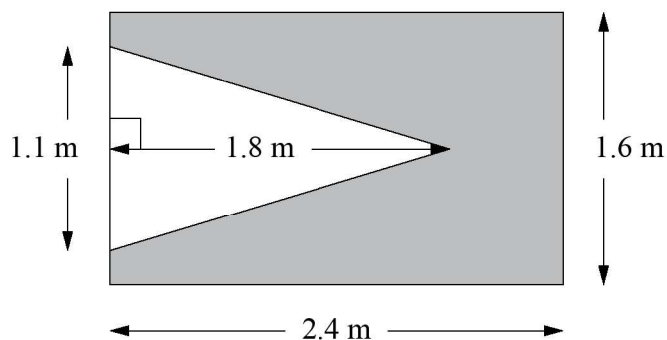
Note: If you make a mistake in the sketch, cancel it by ruling a single diagonal line through your work and use the additional response space on page 20 of this question and response book.

- b) Use the sketch from Question 5a) to calculate the width of the TV screen in metres (m), rounded to two decimal places. *[3 marks]*

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QUESTION 6 (5 marks)

A flag in the shape of a rectangle is designed with a triangular emblem as shown.



Not to scale

- a) Calculate the area of the flag in square metres (m^2).

[1 mark]

- b) Calculate the area of the triangular emblem in square metres (m^2).

[1 mark]

The flag designer estimates that the triangular emblem covers one quarter of the flag area.

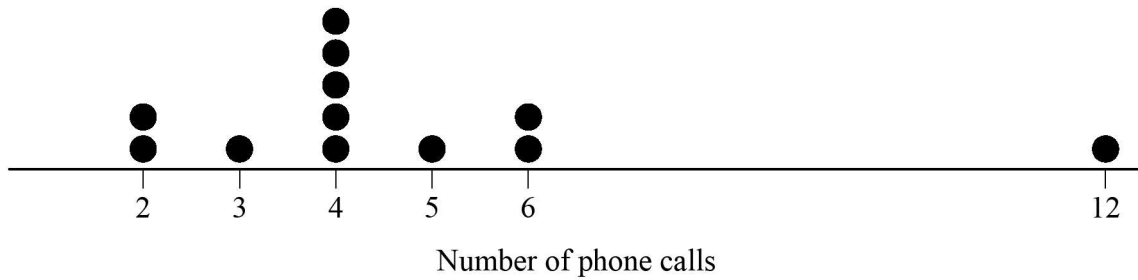
- c) Use the results from Question 6a) and 6b) to evaluate the reasonableness of the flag designer's estimate.

[3 marks]

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QUESTION 7 (3 marks)

Twelve people were surveyed about the number of phone calls they made on a particular day. The results are displayed in the dot plot.



- a) Identify the modal number of phone calls.

[1 mark]

- b) Describe the spread for the number of phone calls.

[2 marks]

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QUESTION 8 (7 marks)

A student attended 12 netball training sessions. The number of goals they scored during each training session is recorded in the table.

Number of goals	12	11	6	21	5	10	8	14	18	16	15	16
-----------------	----	----	---	----	---	----	---	----	----	----	----	----

- a) Calculate the mean number of goals scored, rounded to a whole number.

[3 marks]

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

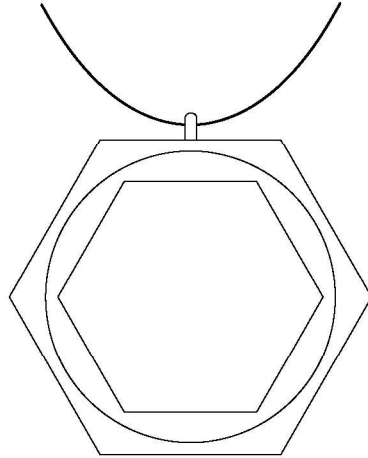
[4 marks]

	Lower quartile (Q_1)		Upper quartile (Q_3)	
	9		16	

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QUESTION 9 (3 marks)

A jeweller designed a pendant consisting of a circle between two regular hexagons as shown. The side length of the inner hexagon is 28 millimetres (mm). The side length of the outer hexagon is 36 millimetres (mm).



Not to scale

- a) Calculate the perimeter of the inner hexagon and the perimeter of the outer hexagon in millimetres (mm).

[2 marks]

- b) Use the result from Question 9a) to estimate the circumference of the circle in millimetres (mm).

[1 mark]

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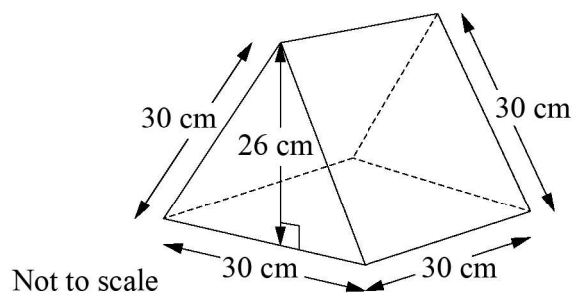
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Part B: Complex

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

QUESTION 10 (5 marks)

Jay is using recycled plywood to make a birdhouse in the shape of a triangular prism, as shown.



- a) Construct a scale drawing of the net of the birdhouse, using a scale of 1 : 10, in the space provided. The response lines on the next page can be used for your working.

[2 marks]

Note: If you make a mistake in the scale drawing, cancel it by ruling a single diagonal line through your work and use the additional response space on page 21 of this question and response book.

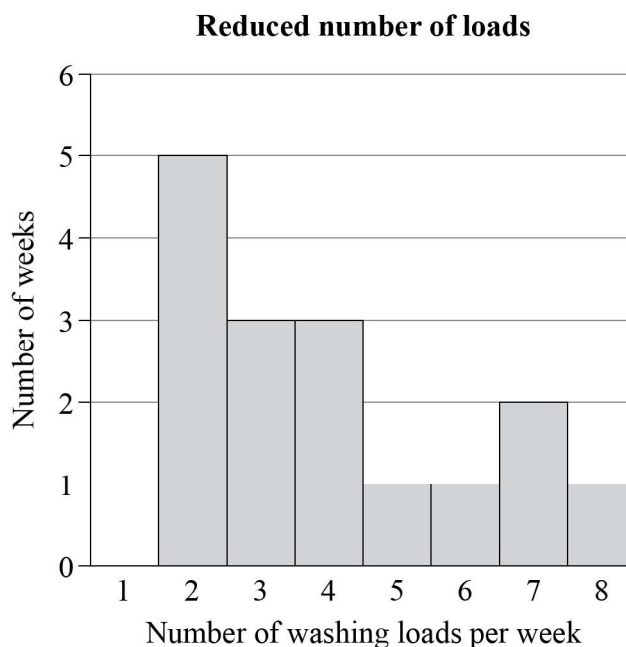
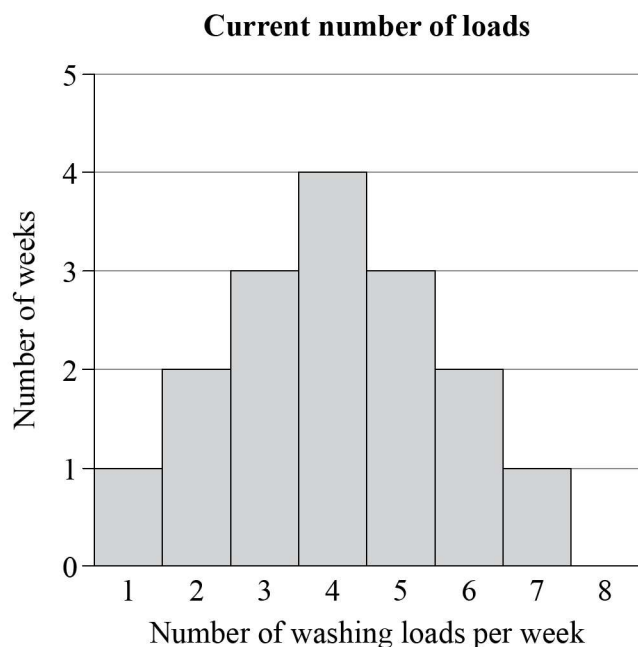
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b) Calculate the area of plywood required to make the birdhouse in square metres (m^2). [3 marks]

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QUESTION 11 (5 marks)

A newspaper article used histograms to claim that a household could save water by reducing the average number of washing loads completed per week. A reader analysed the data and concluded that each histogram actually shows the same average number of washing loads.



Use all measures of central tendency to evaluate the reasonableness of the reader's conclusion. Compare the shape of the histograms to identify characteristics that led the newspaper to claim a reduction in the average number of washing loads completed per week.

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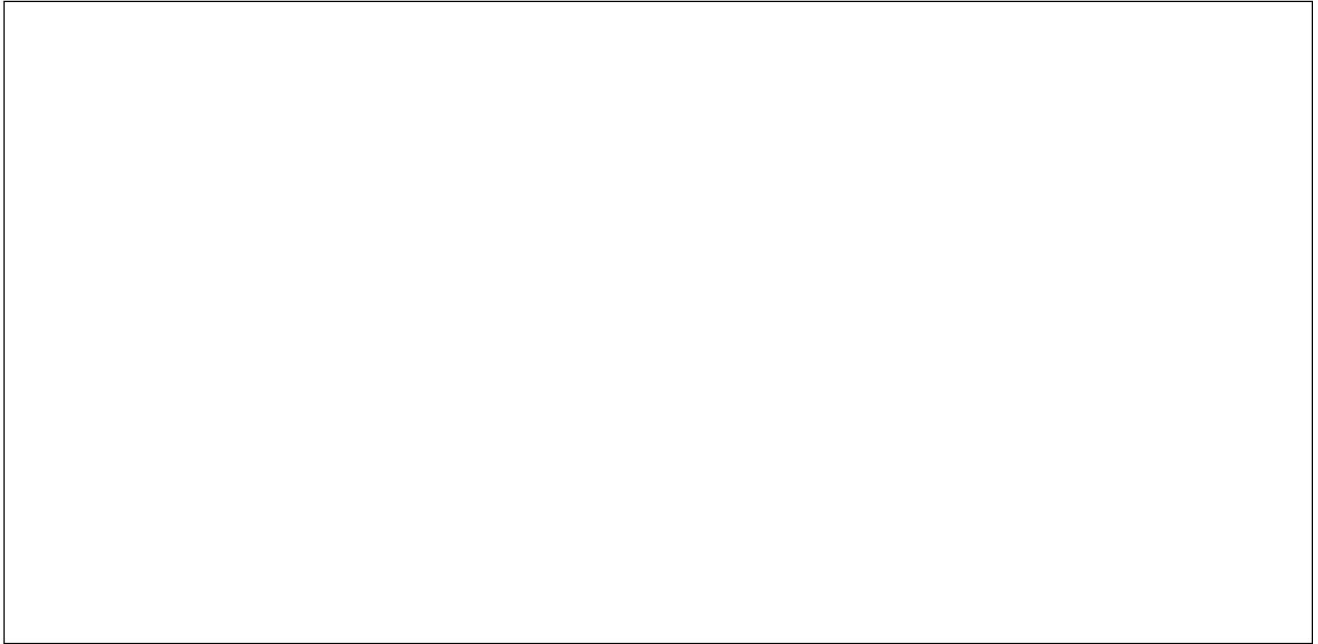


[illegible]

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ADDITIONAL RESPONSE SPACE FOR QUESTION 5a)

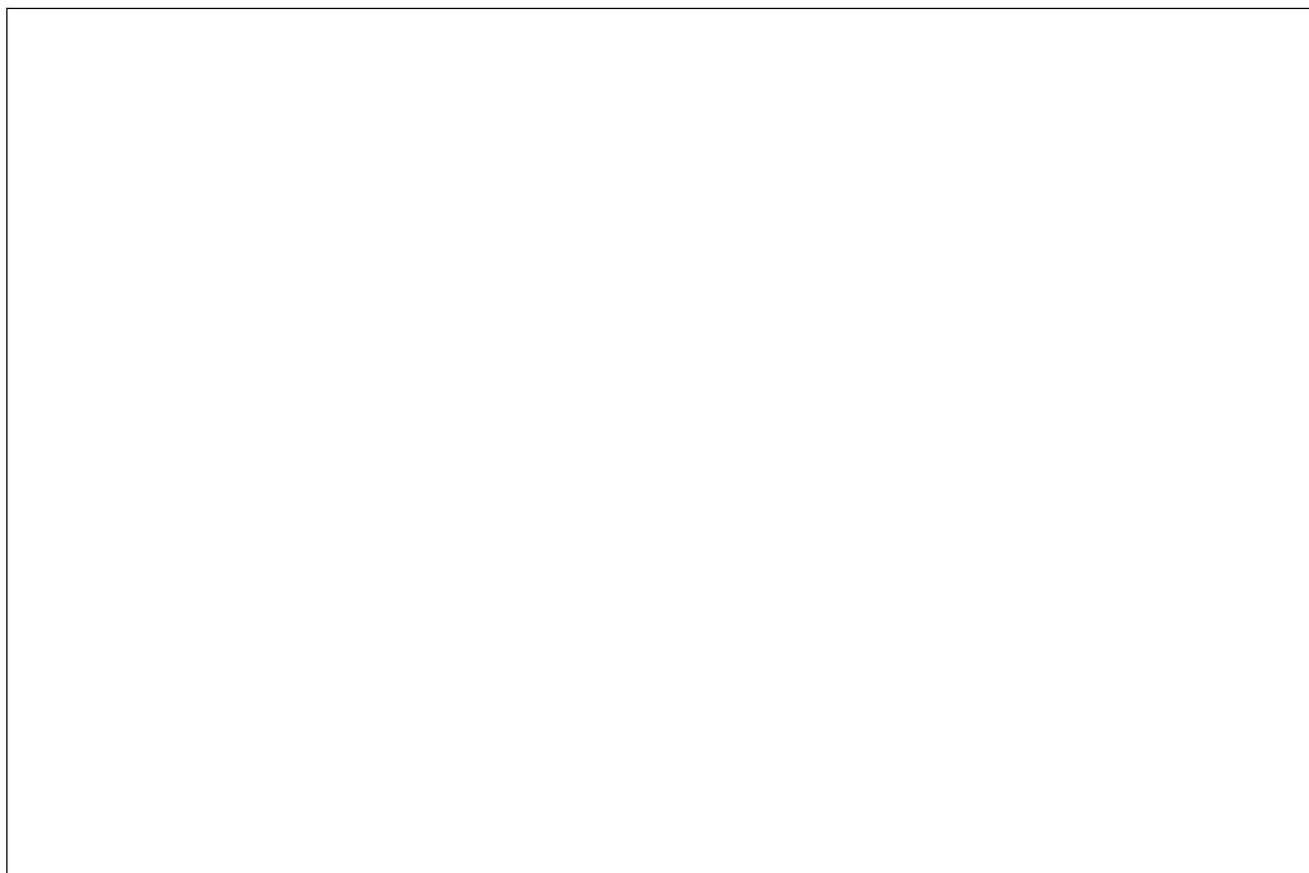
If you want this sketch to be marked, rule a single diagonal line through the sketch on page 6.



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ADDITIONAL RESPONSE SPACE FOR QUESTION 10a)

If you want this scale drawing to be marked, rule a single diagonal line through the scale drawing on page 12.

A large, empty rectangular box with a thin black border, intended for a scale drawing. It occupies the majority of the page area below the instructions.

Do not write outside this box.



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