

Essential Mathematics

marking guide and response

Common internal assessment 2025 — Phase 1

Short response (50 marks)

Assessment objectives

This assessment instrument is used to determine student achievement in the following objectives:

1. select, recall and use facts, rules, definitions and procedures drawn from all Unit 3 Topics
2. comprehend mathematical concepts and techniques drawn from all Unit 3 Topics
3. communicate using mathematical, statistical and everyday language and conventions
4. evaluate the reasonableness of solutions
5. justify procedures and decisions by explaining mathematical reasoning
6. solve problems by applying mathematical concepts and techniques drawn from all Unit 3 Topics.

Purpose

This marking guide informs schools and students how marks are matched to characteristics in responses to the common internal assessment.

The marking guide provides:

- explicit statements about what is expected of students when they respond to a question
- sample responses that identify characteristics to assist the marker to make judgments
- where relevant, notes that provide further information to assist the marker in making a decision
- a tool for calibrating markers to ensure comparability of results.

Mark allocation

Where a response does not meet any of the descriptors for a question or a criterion, a mark of '0' will be recorded.

Allow FT mark/s — refers to 'follow through', where an error in the prior section of working is used later in the response, a mark (or marks) for the rest of the response can still be awarded so long as it still demonstrates the correct conceptual understanding or skill in the rest of the response.

This mark may be implied by subsequent working — the full mathematical reasoning and/or working, as outlined in the sample response and associated mark, is not explicitly stated in the student response, but by virtue of subsequent working there is sufficient evidence to award the mark/s.

Marking guide

Q	Sample response	The response:
1	Number of portions $= 850 \div 37$ $= 22.97$ ≈ 23	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	One bottle of dishwashing liquid contains approximately 23 average portions.	<ul style="list-style-type: none"> correctly determines approximate number of average portions to the nearest whole number [1 mark]
2a)	Actual length = 4.5×15 $= 67.5$ cm	<ul style="list-style-type: none"> correctly determines actual length in centimetres [1 mark]
2b)	Actual width = 3×15 $= 45$ cm	<ul style="list-style-type: none"> correctly determines actual width in centimetres [1 mark]
2c)	Area of tile $A = lw$ $= 67.5 \times 45$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	$= 3\,037.5 \text{ cm}^2$	<ul style="list-style-type: none"> calculates area of tile [1 mark]

Q	Sample response	The response:
3a)	Using Pythagoras' theorem to work out height, (b) $c^2 = a^2 + b^2$ $160^2 = 120^2 + b^2$	<ul style="list-style-type: none"> • correctly provides mathematical reasoning or working to support the answer [1 mark]
	$b^2 = 160^2 - 120^2$ $b^2 = 11\,200$ $b = \sqrt{11\,200}$ $b = 105.83$	<ul style="list-style-type: none"> • determines value of b^2 [1 mark]
	The height is 106 cm.	<ul style="list-style-type: none"> • calculates height rounded to the nearest centimetre [1 mark]
3b)	Convert measurements to metres length = 1.2 m height = 1.06 m	<ul style="list-style-type: none"> • converts length and height to metres [1 mark]
	Perimeter of rectangular retaining wall $P = \text{total of all sides}$ $= 1.2 + 1.2 + 1.06 + 1.06$	<ul style="list-style-type: none"> • provides mathematical reasoning or working to support the answer [1 mark]
	$= 4.52 \text{ m}$	<ul style="list-style-type: none"> • calculates perimeter in metres [1 mark]

Q	Sample response	The response:
4a)	Volume of container $V = Ah$ $= 5 \times 2 \times 1$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	$= 10 \text{ m}^3$	<ul style="list-style-type: none"> estimates volume [1 mark]
4b)	Approximate mass of sand $= 2000 \text{ kg/m}^3 \times 10 \text{ m}^3$ $= 20000 \text{ kg}$	<ul style="list-style-type: none"> determines approximate mass in kilograms [1 mark]
4c)	1 tonne = 1000 kg $\therefore 20000 \text{ kg} \div 1000 \text{ kg/tonne} = 20 \text{ tonnes}$	<ul style="list-style-type: none"> converts approximate mass to tonnes [1 mark]
4d)	Cost = 20×275 $= \$5500$	<ul style="list-style-type: none"> determines approximate total cost [1 mark]

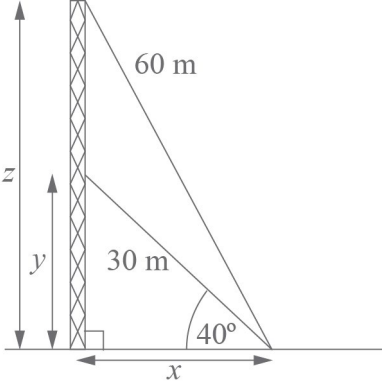
Q	Sample response	The response:
5a)	5 faces	<ul style="list-style-type: none"> correctly states number of faces [1 mark]
5b)	Total length = $14.4 \text{ cm} \times 4 + 27 \text{ cm} \times 4$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	= 165.6 cm	<ul style="list-style-type: none"> calculates total length [1 mark]
5c)	Volume of lantern $V = \frac{1}{3}Ah$ $= \frac{1}{3} \times 14.4^2 \times 25$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	= 1728 cm ³	<ul style="list-style-type: none"> calculates volume of lantern [1 mark]
5d)	Fraction of box = $\frac{1728}{6912}$	<ul style="list-style-type: none"> determines fraction [1 mark]

Q	Sample response	The response:									
6a)	$\text{Mean} = \frac{\sum x}{n}$ $= \frac{120}{13}$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark] 									
	≈ 9.23	<ul style="list-style-type: none"> calculates mean [1 mark] 									
6b)	$3 \ 5 \ 6 \ 6 \ 6 \ 7 \ 10 \ 11 \ 12 \ 12 \ 12 \ 15 \ 15$ <p style="text-align: center;">Q_2</p>	<ul style="list-style-type: none"> correctly orders all the data values [1 mark] 									
	Median = 10	<ul style="list-style-type: none"> correctly determines median [1 mark] 									
6c)	Minimum = 3 Maximum = 15	<ul style="list-style-type: none"> correctly determines minimum and maximum values [1 mark] 									
	Five-number summary: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Minimum</th> <th>Q₁</th> <th>Q₂</th> <th>Q₃</th> <th>Maximum</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">6</td> <td style="text-align: center;">10</td> <td style="text-align: center;">12</td> <td style="text-align: center;">15</td> </tr> </tbody> </table>	Minimum	Q ₁	Q ₂	Q ₃	Maximum	3	6	10	12	15
Minimum	Q ₁	Q ₂	Q ₃	Maximum							
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Q	Sample response	The response:
7a)	Arc length of enclosure $l = \frac{\theta}{180} \pi r$ $= \frac{180}{180} \times \pi \times 5$ $= 1 \times \pi \times 5$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	$= 15.70796$ $\approx 15.71\text{m}$	<ul style="list-style-type: none"> calculates arc length rounded to two decimal places [1 mark]
7b)	Perimeter of enclosure $= 15.71\text{m} + 5\text{m} + 5\text{m}$ $= 25.71\text{ m}$	<ul style="list-style-type: none"> determines the perimeter [1 mark]

Q	Sample response	The response:
8a)	Area of garage door $A = lw$ $= 2.4 \times 4.8$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	$= 11.52 \text{ m}^2$	<ul style="list-style-type: none"> correctly calculates garage door area [1 mark]
8b)	Area of decorative panel $A = bh$ $= 2.7 \times 1.1$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	$= 2.97 \text{ m}^2$	<ul style="list-style-type: none"> correctly calculates area of decorative panel [1 mark]
8c)	<p>One quarter of garage door area $= 11.52 \div 4$ $= 2.88$ $2.88 < 2.97$</p> <p>The homeowner's claim is reasonable as the decorative panel covers more than one quarter.</p>	<ul style="list-style-type: none"> explains why the claim is reasonable [1 mark]

Q	Sample response	The response:
9a)	The mode number of points per game is 20.	<ul style="list-style-type: none"> correctly identifies mode [1 mark]
9b)	The spread is tightly packed around 20 points per game. The spread also contains an outlier of 32 points.	<ul style="list-style-type: none"> correctly describes a feature of the spread [1 mark] correctly describes a second feature of the spread [1 mark]
10)	$S = 2\pi rh + \pi r^2$ $= 2 \times \pi \times 2.2 \times 5 + \pi \times 2.2^2$ $= 84.32034$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	$\approx 84.32\text{m}^2$	<ul style="list-style-type: none"> determines required surface area [1 mark]
	Determine how many litres required $= \frac{84.32}{5}$ $= 16.864$ $\approx 17\text{ L}$	<ul style="list-style-type: none"> determines amount of paint required rounded up to the nearest litre [1 mark]
	Determine cost for paint $= 17 \times 22.90$ $= \$389.30$	<ul style="list-style-type: none"> determines cost [1 mark]
	The family can't buy enough paint as the cost is \$389.30 and they have \$350.	<ul style="list-style-type: none"> determines if family can buy enough paint [1 mark]

Q	Sample response	The response:
11	<p>Identify variables x = horizontal distance from radio tower y = lower wire height z = radio tower height</p>  <p>Horizontal distance from radio tower.</p> $\cos \theta = \frac{\text{adj}}{\text{hyp}}$ $\cos 40^\circ = \frac{x}{30}$ $x = \cos 40^\circ \times 30$ $x = 22.98 \text{ m}$	<ul style="list-style-type: none"> • correctly determines horizontal distance from radio tower [1 mark]

Q	Sample response	The response:
	<p>Lower wire height</p> $\sin \theta = \frac{\text{opp}}{\text{hyp}}$ $\sin 40^\circ = \frac{y}{30}$ $y = \sin 40^\circ \times 30$ $y = 19.28\text{m}$	<ul style="list-style-type: none"> determines lower wire height [1 mark]
	<p>Height of radio tower</p> $c^2 = a^2 + b^2$ $60^2 = 22.98^2 + z^2$ $z = \sqrt{60^2 - 22.98^2}$ $z = 55.42\text{m}$	<ul style="list-style-type: none"> determines height of radio tower [1 mark]
	<p>The lower wire is not in an appropriate position. The lower wire is 19.28 m high, which is less than halfway up the radio tower, which is 55.42 m tall.</p>	<ul style="list-style-type: none"> determines whether the wire is at an appropriate position [1 mark]
		<ul style="list-style-type: none"> shows logical organisation [1 mark]



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