

Essential Mathematics

marking guide and response

Common internal assessment 2025 — Ancillary phase

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:
1a)	Actual base length = 10×5 = 50 cm	<ul style="list-style-type: none"> correctly determines actual base length in centimetres [1 mark]
1b)	Actual perpendicular height = 5×5 = 25 cm	<ul style="list-style-type: none"> correctly determines actual perpendicular height in centimetres [1 mark]
1c)	Area of paver $A = bh$ = 50×25	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	= 1250 cm ²	<ul style="list-style-type: none"> calculates area of paver [1 mark]

Q	Sample response	The response:
2a)	Using Pythagoras' theorem to work out width, (b) $c^2 = a^2 + b^2$ $280^2 = 220^2 + b^2$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	$b^2 = 280^2 - 220^2$ $b^2 = 30000$ $b = \sqrt{30000}$ $b = 173.21$	<ul style="list-style-type: none"> determines value of b^2 [1 mark]
	The width is 173 cm.	<ul style="list-style-type: none"> calculates width rounded to the nearest centimetre [1 mark]
2b)	Convert measurements to metres width = 1.73 m length = 2.2 m	<ul style="list-style-type: none"> converts width and length to metres [1 mark]
	Perimeter of rectangular gate $P = \text{total of all sides}$ $= 2.2 + 2.2 + 1.73 + 1.73$	<ul style="list-style-type: none"> provides mathematical reasoning or working to support the answer [1 mark]
	$= 7.86 \text{ m}$	<ul style="list-style-type: none"> calculates perimeter in metres [1 mark]

Q	Sample response	The response:
3	Number of applications $= 500 \div 15$ $= 33.33$ ≈ 33 <hr/> There are approximately 33 applications of sunscreen in one bottle.	<ul style="list-style-type: none"> • correctly provides mathematical reasoning or working to support the answer [1 mark] • correctly determines approximate number of applications to the nearest whole number [1 mark]

Q	Sample response	The response:									
4a)	$\text{Mean} = \frac{\sum x}{n}$ $= \frac{212}{13}$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark] 									
	≈ 16.308	<ul style="list-style-type: none"> calculates mean [1 mark] 									
4b)	Q_2 <p>3 7 8 8 12 14 15 17 21 22 22 28 35</p>	<ul style="list-style-type: none"> correctly orders all the data values [1 mark] 									
	<p>Median = 15</p>	<ul style="list-style-type: none"> correctly determines median [1 mark] 									
4c)	<p>Minimum = 3 Maximum = 35</p>	<ul style="list-style-type: none"> correctly determines minimum and maximum values [1 mark] 									
	<p>Five-number summary:</p> <table border="1"> <thead> <tr> <th>Minimum</th> <th>Q₁</th> <th>Q₂</th> <th>Q₃</th> <th>Maximum</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>8</td> <td>15</td> <td>22</td> <td>35</td> </tr> </tbody> </table>	Minimum	Q ₁	Q ₂	Q ₃	Maximum	3	8	15	22	35
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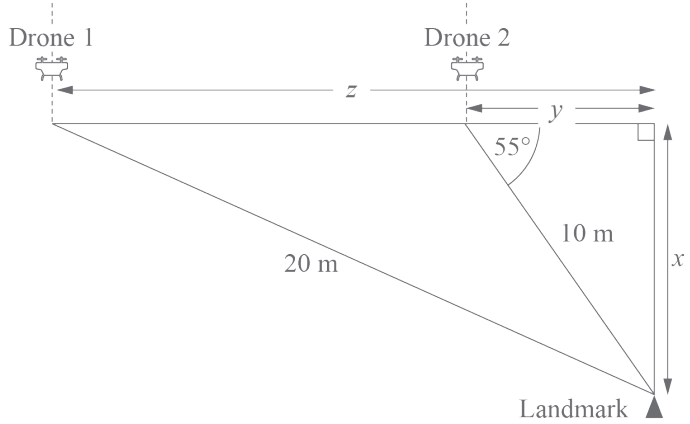
Q	Sample response	The response:
5a)	Volume of sculpture $V = \frac{1}{3}Ah$ $= \frac{1}{3} \times 2^2 \times 3$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	$= 4 \text{ m}^3$	<ul style="list-style-type: none"> estimates volume [1 mark]
5b)	Approximate mass of sculpture $= 900 \text{ kg/m}^3 \times 4 \text{ m}^3$ $= 3600 \text{ kg}$	<ul style="list-style-type: none"> determines approximate mass in kilograms [1 mark]
5c)	1 tonne = 1000 kg $\therefore 3600 \text{ kg} \div 1000 \text{ kg/tonne} = 3.6 \text{ tonnes}$	<ul style="list-style-type: none"> converts approximate mass to tonnes [1 mark]
5d)	Cost = 300×3.6 $= \$1080$	<ul style="list-style-type: none"> determines approximate total cost [1 mark]

Q	Sample response	The response:
6a)	Arc length of flower bed $l = \frac{\theta}{180} \pi r$ $= \frac{60}{180} \times \pi \times 4$ $= \frac{1}{3} \times \pi \times 4$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	$= 4.18879$ $\approx 4.19 \text{ m}$	<ul style="list-style-type: none"> calculates arc length rounded to two decimal places [1 mark]
6b)	Perimeter of flower bed $= 4.19 \text{ m} + 4 \text{ m} + 4 \text{ m}$ $= 12.19 \text{ m}$	<ul style="list-style-type: none"> determines the perimeter [1 mark]
7a)	The mode number of warm-up laps is 8.	<ul style="list-style-type: none"> correctly identifies mode [1 mark]
7b)	The spread is clustered around 7 to 9 warm-up laps. The spread also contains an outlier of 1 warm-up lap.	<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]

Q	Sample response	The response:
8a)	6 faces	<ul style="list-style-type: none"> correctly states number of faces [1 mark]
8b)	Total length = 12×30 cm	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	= 360 cm	<ul style="list-style-type: none"> calculates total length [1 mark]
8c)	Volume of fish tank $V = Ah$ = $30^2 \times 30$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	= 27000 cm ³	<ul style="list-style-type: none"> calculates volume of fish tank [1 mark]
8d)	Fraction of fish tank = $\frac{20250}{27000}$	<ul style="list-style-type: none"> determines fraction [1 mark]

Q	Sample response	The response:
9a)	Area of fridge calendar $A = lw$ $= 10 \times 4$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	$= 40 \text{ cm}^2$	<ul style="list-style-type: none"> correctly calculates fridge calendar area [1 mark]
9b)	Area of magnet $A = \frac{1}{2}bh$ $= \frac{1}{2}(3 \times 2.5)$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	$= 3.75 \text{ cm}^2$	<ul style="list-style-type: none"> correctly calculates area of magnet [1 mark]
9c)	20% of fridge calendar $= 0.2 \times 40$ $= 8$ $3.75 < 8$ The company's claim is not reasonable because 3.75 cm^2 is less than 8 cm^2 .	<ul style="list-style-type: none"> explains why claim is not reasonable [1 mark]

Q	Sample response	The response:
10)	$S = \text{base} + 2 \text{ long walls} + 2 \text{ short walls}$ $= (4 \times 2) + 2(4 \times 1.8) + 2(2 \times 1.8)$ $= 8 + 14.4 + 7.2$	<ul style="list-style-type: none"> correctly provides mathematical reasoning or working to support the answer [1 mark]
	$= 29.6 \text{ m}^2$	<ul style="list-style-type: none"> determines required surface area [1 mark]
	<p>Determine how many litres required</p> $= \frac{29.6}{6.2}$ $= 4.774$ $\approx 5 \text{ L}$	<ul style="list-style-type: none"> determines amount of sealant required rounded up to nearest litre [1 mark]
	<p>Determine cost for sealant</p> $= 5 \times 30.50$ $= \$152.50$	<ul style="list-style-type: none"> determines cost [1 mark]
	<p>The family cannot buy enough waterproof sealant. The cost is \$152.50 and they have only budgeted \$130.</p>	<ul style="list-style-type: none"> determines if family can buy enough waterproof sealant [1 mark]

Q	Sample response	The response:
11	<p>Identify variables x = vertical height of the drones y = first drone horizontal distance z = second drone horizontal distance</p>  <p>Vertical height of drones</p> $\sin \theta = \frac{\text{opp}}{\text{hyp}}$ $\sin 55^\circ = \frac{x}{10}$ $x = \sin 55^\circ \times 10$ $x = 8.19 \text{ m}$	<ul style="list-style-type: none"> • correctly determines vertical height of drones [1 mark]

Q	Sample response	The response:
	Drone 2's horizontal distance $c^2 = a^2 + b^2$ $10^2 = 8.19^2 + y^2$ $y = \sqrt{10^2 - 8.19^2}$ $y = 5.74 \text{ m}$	<ul style="list-style-type: none"> determines drone 2's horizontal distance [1 mark]
	Drone 1's horizontal distance $c^2 = a^2 + b^2$ $20^2 = 8.19^2 + z^2$ $y = \sqrt{20^2 - 8.19^2}$ $y = 18.25 \text{ m}$	<ul style="list-style-type: none"> determines drone 1's horizontal distance [1 mark]
	The drone operator's claim is correct because 18.25 m places drone 1 more than 10 m from drone 2.	<ul style="list-style-type: none"> decides if claim is correct [1 mark]
		<ul style="list-style-type: none"> shows logical organisation [1 mark]



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