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CAMBRIDGE
International Education

Cambridge IGCSE™

MATHEMATICS **0580/43**

Paper 4 (Extended) **May/June 2026**

MARK SCHEME

Maximum Mark: 100

Published

This mark scheme contains the instructions and marking guidance that our examiners used to mark candidate responses for this component.

Before they start marking, examiners complete a standardisation process. They review a range of candidate responses and discuss the mark scheme in detail to agree which answers can and cannot be accepted. Examiners award marks where it is clear that candidate responses have met the requirements of the mark scheme. These requirements may vary between different components or different versions of the same component, depending on the exact requirements of the question and the candidate responses seen during the standardisation process.

Sometimes, our mark schemes may allow marks to be awarded to responses which contain elements that are factually incorrect or for content not covered by the syllabus. We do this in response to the demands of a specific question to support candidates and make sure that our assessments are fair. However, these allowances should not be used as a guide for teaching and learning.

We cannot discuss the mark scheme with schools, and we recommend that schools read the mark scheme together with the assessment material and the Principal Examiner Report for Teachers.

This document consists of **20** printed pages.

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General marking principles

All examiners must apply these marking principles when marking candidate responses.

1	Examiners must award marks for each response in line with: • the specific **content** defined in the mark scheme • the specific **skills** defined in the mark scheme or in the level descriptions • the **standard of response** required as exemplified by the standardisation scripts.
2	Examiners must award **whole marks** (not half marks, or other fractions).
3	Examiners must award marks **positively**. This means that: • marks are not deducted for errors or omissions • marks are awarded for correct/valid answers as defined in the mark scheme and also for **other valid answers** which go beyond the scope of the syllabus and mark scheme referring to your team leader as appropriate • the quality of spelling, punctuation and grammar are judged **only** when the mark scheme indicates that these features are **specifically assessed** in the question. However, the meaning of all responses must be unambiguous.
4	Examiners must **consistently** apply the requirements of the mark scheme and any rules for what to do when candidates have not followed instructions correctly.
5	Examiners must use the **full range of marks** defined in the mark scheme, unless limited by the quality of the candidate responses seen.
6	Examiners must award marks according to the mark scheme and **must not** award marks with grade thresholds or grade descriptions in mind.

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Mathematics-specific marking principles

1 Unless a particular method has been specified in the question, full marks may be awarded for any correct method. However, if a calculation is required then no marks will be awarded for a scale drawing.

2 Unless specified in the question, non-integer answers may be given as fractions, decimals or in standard form. Ignore superfluous zeros, provided that the degree of accuracy is not affected.

3 Allow alternative conventions for notation if used consistently throughout the paper, e.g. commas being used as decimal points.

4 Unless otherwise indicated, marks once gained cannot subsequently be lost, e.g. wrong working following a correct form of answer is ignored (isw).

5 Where a candidate has misread a number or sign in the question and used that value consistently throughout, provided that number does not alter the difficulty or the method required, award all marks earned and deduct just 1 A or B mark for the misread.

6 Recovery within working is allowed, e.g. a notation error in the working where the following line of working makes the candidate's intent clear.

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Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

Annotations

Annotation	Meaning
	More information required
	Accuracy mark awarded zero
	Accuracy mark awarded one
	Accuracy mark awarded two
	Accuracy mark awarded three
	Independent mark awarded zero
	Independent mark awarded one
	Independent mark awarded two
	Independent mark awarded three
	Benefit of the doubt

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Annotation	Meaning
C	Communication mark
✗	Incorrect
FT	Follow through
Highlighter	Highlight a key point in the working
ISW	Ignore subsequent work
M0	Method mark awarded zero
M1	Method mark awarded one
M2	Method mark awarded two
M3	Method mark awarded three
MR	Misread
O	Omission
Off-page comment	Allows comments to be entered at the bottom of the RM marking window and then displayed when the associated question item is navigated to.
On-page comment	Allows comments to be entered in speech bubbles on the candidate response.
Pre	Premature rounding/approximation
SC	Special case
SEEN	Indicates that work/page has been seen
TE	Transcription error

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Annotation	Meaning
	Correct
XP	Correct answer from incorrect working

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MARK SCHEME NOTES

The following notes are intended to aid interpretation of mark schemes in general, but individual mark schemes may include marks awarded for specific reasons outside the scope of these notes.

Types of mark

M Method marks, awarded for a valid method applied to the problem.

A Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. For accuracy marks to be given, the associated Method mark must be earned or implied.

B Mark for a correct result or statement independent of Method marks.

When a part of a question has two or more 'method' steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. The notation 'dep' is used to indicate that a particular M or B mark is dependent on an earlier mark in the scheme.

Abbreviations

awrt	answers which round to
cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
nfww	not from wrong working
oe	or equivalent
rot	rounded or truncated
SC	Special Case
soi	seen or implied

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Question	Answer	Marks	Partial Marks	Guidance
1	32	**1**		
2	6.71	**1**		Accept $6\frac{71}{100}$.
3	–2.4 cao	**2**	**B1** for –2.391 to –2.39[0] seen If 0 scored, **SC1** for *their* more accurate decimal answer seen and correctly rounded to 2 sf	
4(a)	325.5[0]	**1**		Accept answer 326 provided 325.5[0] seen in working.
4(b)	161.29	**1**		Accept 161 or 161.3 or 161.29... Allow 161.30 in this context.
5	735 315	**3**	**B2** for either correct or **M2** for $\frac{420}{4}\times 7$ **and** $\frac{420}{4}\times 3$ or $\frac{1050}{10}\times 7$ **and** $\frac{1050}{10}\times 3$ or **M1** for 4 parts = 420 soi or **M1** for $\frac{420+x}{x}=\frac{7}{3}$ or $\frac{x-420}{x}=\frac{3}{7}$	M2 implied by 735 and 315. M1 implied by 105 or by total amount = 1050. M1 for a correct equation leading to either 315 or 735.
6(a)	3 points correctly plotted	**2**	**B1** for 2 points correctly plotted	Tolerance: half small square radially.
6(b)	Negative	**1**		Ignore any qualifier.

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Question	Answer	Marks	Partial Marks	Guidance
6(c)	Ruled line of best fit	**1**		For 7 or more points, line must pass between (6, 34) and (6, 36) and between (30, 6) and (30, 8), but ignore point at (13, *k*) as an attempt at Q6(d). If no points plotted, the line must pass between (5, 35) and (5, 37) and between (21, 19) and (21, 21). For both options, condone the line if it falls no more than 1 square short of gates.
6(d)	Reading from *their* line of best fit at 13	**1**	dep on *their* straight line of best fit with negative gradient	Answer must be an integer. If line passes between the integers *n* and *n* + 1, accept either *n* or *n* + 1.
7(a)	11.9 or 11.87….	**3**	**M2** for $25^2 - 22^2$ or **M1** for $25^2 = 22^2 + h^2$ OR **M2** for $22 \times \tan\left(\cos^{-1}\left(\frac{22}{25}\right)\right)$ oe or **M1** for $\frac{h}{22} = \tan\left(\cos^{-1}\left(\frac{22}{25}\right)\right)$ oe	Mark at most accurate. Final answer of $\sqrt{141}$ implies M2. For responses involving multiple stages, each stage must be a correct method. M2 is awarded for a correct explicit expression for *h* and M1 for a correct implicit expression for *h*.
7(b)	28.3 or 28.4 or 28.34 to 28.42..	**2**	**M1** for $\cos = \frac{22}{25}$ oe	Mark at most accurate. For M1, oe trig method FT *their* height. Further work on the angle 28.4, e.g. 90 + 28.4, spoils the M1, award M0. e.g. $90 \pm \cos^{-1}\left(\frac{22}{25}\right)$ Alternative methods must reach e.g. sin = for M1 to be awarded.

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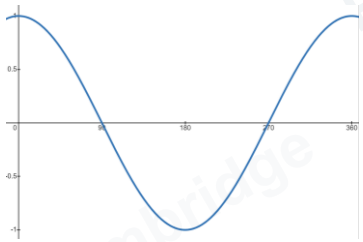
Question	Answer	Marks	Partial Marks	Guidance
8(a)	Alternate angles [are equal]	**1**		Accept alternate interior. Condone alternating. Do not allow Z angles or alt. or alternative angles or alternate segment.
8(b)(i)	7.5	**2**	**M1** for $\frac{5}{x} = \frac{8}{20-8}$ oe or better	Accept $\frac{15}{2}$. Allow use of 80.5 for M1.
8(b)(ii)	19.7 or 19.72 to 19.73	**2**	**M1** for $\frac{1}{2} \times 5 \times 8 \sin 80.5$ oe	Mark at most accurate.
9(a)	60, 80	**1**		
9(b)	55.6	**4**	**M1** for midpoints soi **M1** for Σfx where x is in correct interval including boundary **M1** dep on 2nd M1 for $\frac{\Sigma fx}{100}$	Condone answer $40 < x \leqslant 60$ after correct answer seen. Allow answer 56 after 55.6 seen. Condone 1 error or omission: 10 30 50 70 90 Condone 1 further error or omission (no more than one midpoint outside interval). 40 + 600 + 1550 + 2380 + 990 = 5560 Allow 4 + 20 + 31 + 34 + 11 for 100.
10(a)	Ruled tangent drawn at $t = 2$	**B1**		Ruled line, not a chord, no gap between line and curve at $t = 2$. Minimum length 2cm horizontally.
	0.15 to 0.4	**B1**	Dependent on B1 or close attempt at tangent	Accept answer given as fraction provided decimal value lies in range.

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Question	Answer	Marks	Partial Marks	Guidance
10(b)	5.25	**2**	**M1** for $\frac{18.9\times1000}{60\times60}$ oe or **B1** for final answer figs 525	$5\frac{1}{4}$ implies 2 marks. Answer $\frac{21}{4}$ implies M1. For B1, accept any fraction that leads to a decimal with figs 525, e.g. $\frac{21}{40}$.
11(a)	–4.3 –3.5 –2	**3**	**B1** for each	Accept –4.25 for –4.3, $-\frac{17}{4}$ and $-\frac{7}{2}$
11(b)	Correct graph	**4**	**B3FT** for 8 correct points or **B2FT** for 6 correct points or **B1FT** for 4 correct points	For 4 marks must not be ruled. Mark curve first, accuracy 1mm radially. Condone slight feathering in no more than 2 places. No excessively thick curve or incorrect curvature. Ends of graph should have correct curvature. If not 4 marks, mark plots with same accuracy as curve. If large plot, look at centre of plot with tolerance same as the curve. Curve can imply any missing plots.
11(c)	$y = 2$ drawn	**M1**	Must intersect the curve	Accept good freehand, allow dashed.
	FT their curve and $y = 2$ drawn	**A1**	If 0 scored, **SC1** for $y = 2$ seen and a correct reading from *their* graph	Tolerance: half small square.
11(d)	$y = -5$	**1**		

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Question	Answer	Marks	Partial Marks	Guidance
12(a)	Correct sketch to go through (0, 1), (90, 0), (270, 0) and (360, 1) 	**2**	**B1** for correct shape starting at (0, 1) but inaccurate at roots and/or max/min. Needs at least one complete cycle, but may have more than one. For more than one cycle, must have consistent amplitude (check by eye) or for starting at (0, 1) with all roots and max/min correct but some incorrect curvature.	For 1 or 2 marks, ignore any sketch outside $0 \leqslant x \leqslant 360$. For 2 marks, correct curve starting at (0, 1), passing through (360, 1) and (180, –1), and reasonably close to (90, 0) and (270, 0) with correct curvature. For B1 mark the intention by eye. Award B1 if the 'curve' includes straight lines or has a vertex at min but all other features correct. Ruled graphs score 0.
12(b)	109.5 and 250.5	**3**	**B2** for 1 correct Or **M1** for cos = $-\frac{1}{3}$ oe If M1 or 0 scored, and only 2 angles given, **SC1** if they add to 360	Mark at most accurate. If more than two solutions, mark the worst two. 109 or 109.47… and 251 or 250.53 or 250.52… M1 implied by 109 not as answer. Not multiples of 90.

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Question	Answer	Marks	Partial Marks	Guidance
13(a)	[sin BAC =] $\frac{15\sin 120}{15\sqrt{3}}$ oe	**M2**	or **M1** $\frac{15\sqrt{3}}{\sin 120} = \frac{15}{\sin BAC}$ oe	Accept use of A or C for the angles. For M2, must be angle BAC being calculated. Condone $\frac{\sqrt{3}}{2}$ for sin120. Following an M1 start, M2 can be awarded for seeing a correct rearrangement before reaching sin$A$ = ½, i.e. at least one intermediate step is required. Note: After an M1 start, sin$A$ = ½ as the next step scores M1 and not M2.
	angle BAC = 30	**A1**	**Dep** on M1 nfww	Accept use of x for BAC
	180 – 120 – 30 = 30 with one of: BCA = 30 or BAC = BCA or a comment that two angles are the same.	**A1**	**Dep** on previous A1	Note: M1 A1 A1 is possible.
	Alternative method			
	A correct cosine rule statement with involving AB that would lead to a quadratic in AB	**M1**	e.g. $(15\sqrt{3})^2 = 15^2 + AB^2 - 2\times 15\times AB\cos 120$	Accept use of a variable for AB. For both M1 allow recovery from $15\sqrt{3}^{\ 2}$.
	Correct rearrangement to a 3-term quadratic in AB	**M1**	e.g. $AB^2 + 15AB - 450 = 0$	Must see = 0. For M1 accept 450 written as a product, e.g. 2(225).
	AB = 15	**A1**	dep on second M1 awarded	Second solution not required.
	AB = BC or [Triangle has] two equal sides	**A1**	dep on A1	Note: M1 A1 A1 is not possible.

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Question	Answer	Marks	Partial Marks	Guidance
13(b)	7.5	**3**	**M2** for $\sqrt{15^2-\left(\frac{15\sqrt{3}}{2}\right)^2}$ oe or for 15cos 60 oe **M1** for distance required is the perpendicular from *B* to *AC* soi	Mark at most accurate. Accept $\frac{15}{2}$. For M2 condone 12.99… or 13[.0] for $\frac{15\sqrt{3}}{2}$. M2 for e.g. 15sin 30 oe or $\frac{1}{2}\times15\times15\sqrt{3}\times\sin(their\ 30)=\frac{1}{2}\times15\sqrt{3}\times h$ M1 may be on diagram, must see the right angle symbol. M1 may be implied by correct implicit trig statement, e.g. $\frac{d}{15}=\cos 60$ or correct implicit Pythagoras statement, $d^2+\left(\frac{15\sqrt{3}}{2}\right)^2=15^2$.
14(a)	8.94 or 8.944 to 8.945	**3**	**M2** for $(-3-5)^2+(6-2)^2$ oe or **M1** for (–3 – 5) and (6 – 2) oe	Mark at most accurate. Accept $\sqrt{80}$ or $4\sqrt{5}$ as final answer for 3 marks. Allow recovery from -8^2 or -4^2. Accept 5 + 3 and 2 – 6 M1 implied by $\overrightarrow{AB}=\pm\begin{pmatrix}-8\\4\end{pmatrix}$ oe
14(b)	[*y* =] 2*x* + 9 final answer	**4**	**M1** for [gradient of *AB* =] $\frac{6-2}{-3-5}$ oe **M1** for gradient of perpendicular, *p* = –1 ÷ *their* $-\frac{1}{2}$ oe **M1** for substituting (–2 ,5) into *y* = *their px* + *c* oe where *their p* is not 0 or *their* gradient of *AB*	For 1st M1 look for 6 = –3*m* + *c* and 2 = 5*m* + *c* rearranged to form *am* = *b*. M1 is awarded at this stage provided either *a* or *b* is correct. If correct it should lead to 8*m* = –4.

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Question	Answer	Marks	Partial Marks	Guidance
15	132 or 132.2 or 132.17 to 132.18	**3**	**M2** for $\frac{5^2 + 7^2 - 11^2}{2 \times 5 \times 7}$ or **M1** for $11^2 = 5^2 + 7^2 - 2 \times 5 \times 7\cos x$ If 0 scored **SC1** for 19.7 or 19.6[8…] or 28.13 to 28.14	Mark at most accurate.
	Alternative method			
	130 to 134 from a correct triangle	**3**	Using construction: **B2** for a ruled triangle with all three sides within tolerance of given values or **M1** for a ruled triangle with just two sides in tolerance If 0 scored, **SC1** for measuring largest angle in *their* **scalene** triangle (must be a triangle, not just e.g. 2 lines).	Tolerance ± 2 mm. Tolerance ± 2°.
16	28.0125	**2**	**M1** for 4.25 or 4.15 or 6.85 or 6.75 oe	Accept 4.2 – 0.05, 4.2 + 0.05, 6.8 – 0.05, 6.8 + 0.05 e.g. 42 – 0.5 mm or 68 – 0.5 mm. Accept rounded answers provided 28.0125 seen in working.
17	27.9 or 27.85 to 27.86	**3**	**M2** for $18^2 + 16^2 + 14^2$ or **M1** for $18^2 + 16^2$ or $16^2 + 14^2$ or $18^2 + 14^2$	Mark at most accurate. Final answer $\sqrt{776}$ or $2\sqrt{194}$ gets 3 marks. M2 implied by 776. M1 implied by 580 or 452 or 520 or the square root values.

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Question	Answer	Marks	Partial Marks	Guidance
18(a)(i)	$\frac{2}{3}$ oe	**2**	**M1** for $3x + 3x = 5 - 1$ or better	Mark at most accurate. Accept 0.667 or better.
18(a)(ii)	$\frac{5-x}{3}$ oe final answer	**2**	**M1** for correct first step $x = 5 - 3y$ or $y + 3x = 5$ or $y - 5 = -3x$	Accept $5 - x/3$ if correct version in working. Accept e.g. $\frac{x-5}{-3}$.
18(a)(iii)	$9x - 10$ final answer	**2**	**M1** for $5 - 3(5 - 3x)$	For M1, condone if equated to 0.
18(b)	16	**2**	**M1** for [x =] h(2) or better	
19(a)	2280 final answer	**3**	**B2** for 280 or **M2** for $\frac{2000 \times 3.5 \times 4}{100} + 2000$ oe or **M1** for $\frac{2000 \times 3.5 \times 4}{100}$ oe	
19(b)	15	**3**	**B2** for 14.9[2...] OR **M2** for $3000 \times \left(1 + \frac{3.2}{100}\right)^{14}$ evaluated oe or $3000 \times \left(1 + \frac{3.2}{100}\right)^{15}$ evaluated oe or 1.032^{14} and $\frac{4800}{3000}$ evaluated or 1.032^{15} and $\frac{4800}{3000}$ evaluated	Note: if (1 + 3.2%) used award credit only if evaluations are correct. 4662.[…], accept 4660 For M2 accept $n\log\left(1 + \frac{3.2}{100}\right) = \log\left(\frac{4800}{3000}\right)$ 4811.[…] or 4812, accept 4810 1.5[54…] and 1.6 1.603[…] and 1.6

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Partial Marks</th><th>Guidance</th></tr>
<tr><td>19(b)</td><td></td><td></td><td>or M1 for $3000\times\left(1+\frac{3.2}{100}\right)^{n}$ oe
(accept n or a value of $n > 1$)

or $\left(1+\frac{3.2}{100}\right)^{n} > \frac{4800}{3000}$ oe (allow = , <, ⩽, ⩾)</td><td>M1 may be implied by any value in the 3rd column or any value in the second column compared with 1.6 . Accept values in 3rd column to 3sf or better.

<table>
<tr><th>n</th><th>1.032^{n}</th><th>3000×1.032^{n}</th></tr>
<tr><td>2</td><td>1.0[65…]</td><td>3195.0…</td></tr>
<tr><td>3</td><td>1.0[99…]</td><td>3297.3…</td></tr>
<tr><td>4</td><td>1.1[34…]</td><td>3402.8…</td></tr>
<tr><td>5</td><td>1.1[70…]</td><td>3511.7…</td></tr>
<tr><td>6</td><td>1.2[08…]</td><td>3624.0…</td></tr>
<tr><td>7</td><td>1.2[46…]</td><td>3740.0…</td></tr>
<tr><td>8</td><td>1.2[86…]</td><td>3859.7…</td></tr>
<tr><td>9</td><td>1.3[27…]</td><td>3983.2…</td></tr>
<tr><td>10</td><td>1.3[70…]</td><td>4110.7…</td></tr>
<tr><td>11</td><td>1.4[14…]</td><td>4242.2…</td></tr>
<tr><td>12</td><td>1.4[59…]</td><td>4378.0…</td></tr>
<tr><td>13</td><td>1.5[06…]</td><td>4518.1…</td></tr>
<tr><td>16</td><td>1.6[55…]</td><td>4965.8…</td></tr>
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Question	Answer	Marks	Partial Marks	Guidance
19(c)	3[.00..] or 2.999…. nfww	**3**	**M2** for $\sqrt[6]{\frac{100+19.4}{100}}$ or **M1** for $[P](\ldots)^6 = [P]\ \frac{100+19.4}{100}$	Note: if (1 + 19.4%) or (119.4%) used, award credit only if evaluations are correct. M2 implied by 2.99… or 1.03 or 1.0299…
20(a)	$[\frac{dy}{dx}=] 24x^2 - 6$	**B2**	**B1** for one correct term, $24x^2$ or -6, seen	For B2 or B1, condone +0. For B2 or B1, isw 2nd derivative. For B2, condone poor notation, e.g. $y = 24x^2 - 6$.
	setting *their* derivative = 0 or $\frac{dy}{dx} = 0$	**M1**	**dep** on at least B1 earned	M1 can be implied from a correct method to find x or from correct solutions but must use *their* first derivative. After B2, must use correct derivative = 0 to score M1.
	$\left(\frac{1}{2}, 3\right)$ and $\left(-\frac{1}{2}, 7\right)$	**B2**	**B1** for $x = \frac{1}{2}$ and $x = -\frac{1}{2}$ or for $\left(\frac{1}{2}, 3\right)$ or $\left(-\frac{1}{2}, 7\right)$	

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Question	Answer	Marks	Partial Marks	Guidance
20(b)	$\left(-\frac{1}{2},\ 7\right)$ maximum with correct reason AND $\left(\frac{1}{2}, 3\right)$ minimum with correct reason	**3**	Reasons could be e.g. 1 A reasonable sketch of a positive cubic 2 Correct use of 2nd derivative: $48 \times -0.5 < 0$ or $-24 < 0$, so $\left(-\frac{1}{2},\ 7\right)$ is max oe. $48 \times 0.5 > 0$ or $24 > 0$, so $\left(\frac{1}{2}, 3\right)$ is a min oe. 3 Evaluates correctly values of y on both sides of both correct stationary points 4 Finds gradient on each side of both correct stationary points. **B2** for 1 correct with correct reason for that stationary point or for **both** x-values correct and reasonable sketch of a positive cubic, or for correct substitution and evaluation of **both** of *their* x-values into *their* second derivative or substitution and evaluation for one x-value on both sides of **both** of *their* stationary points to find the gradients soi or the values of y or **M1** for showing [2nd derivative =] $48x$ or correct FT *their* 1st derivative or substitution and evaluation shown for one x-value on both sides of **one** of *their* stationary points to find the gradients soi or the values of y or for sketch of any positive cubic with incorrect answers.	For 3 marks or B2, allow $\left(-\frac{1}{2},\ 7\right)$ and $\left(\frac{1}{2}, 3\right)$ to be implied from working. For 3 marks or B2, accept reasonable sketch drawn in part (b) or referred to if drawn in part (a), accept without axes.  For B3 or B2, if drawn on axes, minimum must be in the 1st quadrant and the maximum in the second quadrant. *y values may be incorrect* The second derivative must be correct FT from *their* first derivative for **B2** or **M1**, accept poor notation May use substitution into *their* dy/dx with stated x-values Accept poor notation. May use substitution into *their* dy/dx

Question	Answer	Marks	Partial Marks	Guidance
21	2870 or 2865 to 2866 nfww	**5**	**M4** for $\frac{1}{3}\pi \times 12^2 \times 27 - \frac{1}{3}\pi \times 8^2 \times 18$ oe or for $\frac{1}{3}\pi \times 12^2 \times 27 \times (1 - \left(\frac{2}{3}\right)^3)$ oe or **M3** for $\frac{1}{3}\pi \times 12^2 \times 27$ oe or $\frac{1}{3}\pi \times 8^2 \times 18$ oe or **B2** for [height of cone] 27 or 18 nfww or $\left(\frac{2}{3}\right)^3$ or $\left(\frac{3}{2}\right)^3$ oe or **M1** for $\frac{h}{8} = \frac{h+9}{12}$ oe or **B1** for scale factor $\frac{2}{3}$ or $\frac{3}{2}$ or 1.5 soi If 0 scored, **SC1** for $\frac{1}{3}\pi \times 12^2 \times (\textit{their } h + 9) - \frac{1}{3}\pi \times 8^2 \times \textit{their } h$ oe	912π final answer for 5 marks M4 for e.g. $\frac{1}{3} \times 9 \times (\pi.8^2 + \pi.12^2 + \sqrt{\pi.8^2.\pi.12^2})$ oe For all marks accept volume scale factor unsimplified, e.g. $\frac{8}{12}$. Large cone: 1296π (but not from $\pi r^2 h = \pi \times 12^2 \times 9$) Small cone: 384π For B2 accept scale factors as ratios, e.g. $3^3 : 2^3$. Accept 0.667 or 0.6666... or better For B1 accept scale factors as ratios, e.g. 12 : 8. i.e. heights differ by 9

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