Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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Cambridge International is publishing the mark schemes for the October/November 2024 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

This document consists of **9** printed pages.

Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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.

Abbreviations

cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

Question	Answer	Marks	Partial Marks
1(a)	56.5 oe	1	
1(b)	17.2[0] cao	3	**M1** for $5 \times 30 \times 13.45$ **M1** for $\dfrac{3324.70 - their\,2017.50}{2 \times 38}$
1(c)	8.85 final answer	4	**M3** for $\dfrac{245 \times 1.39}{50 \times 0.77}$ oe OR **M2** for $\dfrac{245 \times 1.39}{50}$ or $\dfrac{245}{50 \times 0.77}$ or $\dfrac{245 \times 1.39}{0.77}$ OR **M1** for $\dfrac{245}{0.77}$ or $\dfrac{their\,(amount\,in\,£)}{0.77}$ seen and **M1** for $\dfrac{39}{100} \times their\,6.36\,[+their\,6.36]$ seen
1(d)	5284.50	3	**M2** for $12000 \times \left(1 + \dfrac{1.5}{100}\right)^4 + 12000 \times \left(1 + \dfrac{1.5}{100}\right)^3$ or for $24180 \times \left(1 + \dfrac{1.5}{100}\right)^3$ oe or **M1** for $[12000 \times]\left(1 + \dfrac{1.5}{100}\right)^k$ oe $k = 3$ or 4 ISW After 0 scored, **SC1** for $24180 \times \left(1 + \dfrac{1.5}{100}\right)^4$
2(a)(i)	162 108	2	**B1** for one correct or **M1** for $360 - 90 - their$ first angle or **M1** for $\dfrac{k}{160}[\times 360]$ oe or $\dfrac{360}{160}[\times k]$ where $k = 72$ or 48 or **M1** for $\dfrac{48}{40} \times 90$ oe or $\dfrac{72}{40} \times 90$ oe
2(a)(ii)	Correct pie chart	1	**FT** *their* angles adding to 270°
2(b)(i)	Data grouped so individual speeds not known oe	1	

Question	Answer	Marks	Partial Marks
2(b)(ii)	46 44 38 28	3	**B2** for 3 correct or **B1** for 2 correct
3(a)	–2 –2	2	**B1** for each
3(b)	Correct smooth curve	3	**B2FT** for 8 or 9 points correctly plotted or **B1FT** for 6 or 7 points correctly plotted
3(c)	$x = 2$	1	
3(d)	Correct ruled line	2	**B1** for short or unruled line or for two correct coordinates soi or for line with positive gradient passing through (0, 2) or for line with gradient $\dfrac{1}{3}$
3(e)	**STRICT FT** x-coordinates of intersection of *their* ruled line and *their* curve	1	
4(a)	3, 6, 9, 12, 15	1	
4(b)		2	**B1** for Venn diagram with 1 or 2 errors, omissions or repeats or for correct Venn diagram with $\left(A\cup B\right)'$ blank
4(c)	4	1	**FT** *their* Venn diagram
4(d)	2	1	**FT** *their* Venn diagram
5(a)(i)	32	1	
5(a)(ii)	$-\dfrac{3}{2}$ oe final answer	2	**M1** for $3 - 12 = 2x + 4x$ or better or $-2x - 4x = 12 - 3$ or better
5(b)(i)	41.8 oe	2	**M1** for $5 \times 6.2 - 6 \times (-1.8)$ oe
5(b)(ii)	$\dfrac{w + 6y}{5}$ oe final answer	2	**M1** for $w + 6y = 5x$ or $\dfrac{w}{5} = x - \dfrac{6y}{5}$ or $-5x = -6y - w$
5(c)	$(5 - x)(3y + x)$ or $-(x - 5)(3y + x)$ final answer	2	**B1** for one correct partial factorisation seen

Question	Answer	Marks	Partial Marks
5(d)	$\dfrac{x^2 - 2x + 9}{(x-3)(x+3)}$ final answer or $\dfrac{x^2 - 2x + 9}{x^2 - 9}$ final answer	4	**B2** for $2x + 6 - 4x + 12 + x^2 - 3x + 3x - 9$ oe isw or **B1** for $2(x+3) - 4(x-3) + (x-3)(x+3)$ oe isw **B1** for denominator $(x-3)(x+3)$ oe isw After 0 scored, SC1 for $\dfrac{2(x+3) - 4(x-3)}{(x+3)(x-3)}$ oe isw or $\dfrac{-4+x+3}{x+3}$ oe isw or $\dfrac{2+x-3}{x-3}$ oe isw
6(a)	180 or 179.5 to 179.6…	3	**M1** for (cube length)^3 = 343 oe **M1** for $\dfrac{4}{3}\pi \times (\textit{their } 3.5)^3$
6(b)	20	2	**M1** for $\sqrt[3]{\dfrac{1280}{540}}$ oe or $\sqrt[3]{\dfrac{540}{1280}}$ oe or $\dfrac{15^3}{h^3} = \dfrac{540}{1280}$ oe
6(c)	653 or 653.1 to 653.2…	5	**M1** for $8.7^2 - 6.3^2$ **M1** for $\dfrac{3}{2} \times \textit{their } 6$ **M2** for $\pi \times 6.3 \times 8.7 + 2\pi \times 6.3 \times \textit{their } 9$ $\left[+ [2]\pi \times 6.3^2 \right]$ or **M1** for $\pi \times 6.3 \times 8.7$ or $2\pi \times 6.3 \times \textit{their } 9$
7(a)	(–4, 1)	1	
7(b)	6.08 or 6.082 to 6.083	2	**M1** for $(-1)^2 + (-6)^2$ oe
7(c)	$\begin{pmatrix} 4 \\ -8 \end{pmatrix}$	3	**B2** for one component correct or **B1** for [C =] (1, –1) or $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$

Question	Answer	Marks	Partial Marks
7(d)	$y = \dfrac{5}{2}x + 11$ oe final answer	4	**M1** for [gradient $AB =$] $\dfrac{5-7}{2--3}$ oe **M1** for [gradient $L =$] $\dfrac{-1}{their\ \text{gradient } AB}$ **M1** for *their* (–4, 1) substituted into $y = \left(their\ \dfrac{5}{2}\right)x + c$ or $y - 1 = their\dfrac{5}{2}(x - -4)$
8(a)	1.97[0…]	3	**M2** for $\dfrac{320 + 250}{\dfrac{320}{1.6} + \dfrac{250}{2.8}}$ or **M1** for $\dfrac{320}{1.6}$ or $\dfrac{250}{2.8}$
8(b)	195 or 194.79 to 194.81	5	**B4** for 48.19 to 48.3 OR **M1** for $\left[BD^2\right] = 132^2 + 250^2$ oe **M2** for $\cos[\ ] = \dfrac{365^2 + 320^2 - theirBD^2}{2 \times 365 \times 320}$ or better or **M1** for $theirBD^2 = 365^2 + 320^2 - 2 \times 365 \times 320\cos[\ ]$ **M1** for bearing = 243 – *their BAD*
9(a)	[$x =$] 98	**B2**	**B1** for $\angle ABE = 28$ or $\angle AEC = 126$ or **M1** for 180 – 54 – 28 oe
	[$y =$] 72	**B2**	**B1** for $\angle CED = 54$ or $\angle ECD = 54$ or $\angle CED = 180 - 28 - their\ x$ oe

Question	Answer	Marks	Partial Marks
9(b)	35.2 or 35.16 to 35.24	**6**	**B1** for $\angle ORQ = 90$ soi **B1** for $\angle OQR = 20$ or $\angle ROQ = 70$ **M2** for [radius =] $12 \tan \textit{their } 20$ oe or $[PQ =]\dfrac{12\sin(\textit{theirPRQ})}{\sin 35}$ oe or $[PR =]\dfrac{12\sin(\textit{their} 20)}{\sin 35}$ oe or **M1** for $\tan \textit{their} 20 = \dfrac{OR}{12}$ oe or $\dfrac{\sin(\textit{theirPRQ})}{PQ} = \dfrac{\sin 35}{12}$ oe or $\dfrac{\sin(\textit{their} 20)}{PR} = \dfrac{\sin 35}{12}$ oe **M1** for $\dfrac{1}{2}(\textit{theirOR})^2 \sin(180 - \textit{their} 70) + \dfrac{1}{2} \times 12 \times \textit{theirOR}$ or $\dfrac{1}{2} \times 12 \times (\textit{theirOQ} + \textit{theirOP})\sin \textit{their} 20$ oe or $\dfrac{1}{2} \times 12 \times \textit{their } PR \times \sin(\textit{theirPRQ})$
10(a)	$r + r + 6 = x$ oe	**M1**	
	$r = \dfrac{x-6}{2}$ leading to fraction red $= \dfrac{x-6}{2x}$	**A1**	**A0** if any errors or omissions
10(b)	green in A $= \dfrac{x}{2} + 3$ oe	**M1**	Allow green in B $= 4\left(\dfrac{x}{2} + 3\right)$ oe
	Total in B $= x + 4\left(\dfrac{x}{2} + 3\right)$ oe leading to fraction red $= \dfrac{x}{3x + 12}$	**A1**	**A0** if any errors or omissions

Question	Answer	Marks	Partial Marks
10(c)	$(x-6)(3x+12)=2x^2$ oe	M1	Correct removal of fractions
	$3x^2-18x+12x-72$	M1	Accept 3 out of 4 terms correct
	Correct rearrangement to $x^2-6x-72=0$	A1	**A0** if any errors or omissions
10(d)	$(x+6)(x-12)[=0]$	B1	
	12, –6	B1	
10(e)	9	1	**FT** *their* positive solution $\div 2 + 3$
11(a)	$\dfrac{4}{9}$	2	**B1** for answer $\dfrac{4}{n}$ or $\dfrac{n}{9}$ before cancelling
11(b)	$\dfrac{256}{625}$ oe	2	**B1** for $\dfrac{16}{25}$ seen
11(c)	$\dfrac{42}{115}$ oe	3	**M2** for $k \times \dfrac{4}{25} \times \dfrac{21}{24} \times \dfrac{20}{23}$ oe where k = 1, 2 or 3 or **M1** for $\dfrac{a}{25} \times \dfrac{b}{24} \times \dfrac{c}{23}$ oe seen or for $\dfrac{4}{d} \times \dfrac{21}{e} \times \dfrac{20}{f}$ seen or for identifying 3 combinations If 0 scored, **SC1** for answer $\dfrac{5292}{15625}$