Cambridge Assessment International Education

Cambridge IGCSE™

MATHEMATICS **0580/32**

Paper 3 (Core) **May/June 2022**

MARK SCHEME

Maximum Mark: 104

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.

Cambridge International will not enter into discussions about these mark schemes.

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This document consists of **8** printed pages.

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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 descriptors 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.

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Maths-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, 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 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 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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Abbreviations

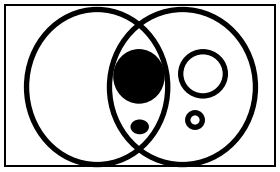
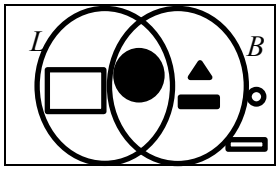
cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

Question	Answer	Marks	Partial Marks
1(a)(i)	48	**1**	
1(a)(ii)	$\frac{5}{16}$ cao	**1**	**FT** their **(a)(i)** provided simplification required and answer given in its simplest form
1(a)(iii)	44 nfww	**2**	**M1** for $\frac{28}{7}[\times 11]$ oe
1(b)(i)	120	**1**	
1(b)(ii)	116	**2**	**M1** for at least first four or last four correctly ordered
1(b)(iii)	110	**2**	**M1** for $\frac{123+98+116+45+67+165+156}{7}$ oe
1(c)(i)	68	**2**	**M1** for $\frac{4.2-2.5}{2.5}[\times 100]$ oe or $\frac{4.2}{2.5}\times 100[-100]$ oe or $\left(\frac{4.2}{2.5}-1\right)[\times 100]$ oe
1(c)(ii)	14 100 or 14 140 or 14 137 to 14 139	**2**	**M1** for $\frac{4}{3}\times\pi\times 15^3$ oe
	cm^3	**1**	
1(d)	*A* With correct comparisons made of the 3 bottles with suitable accuracy shown	**3**	**M2** for 3 correct comparable values, or for a correct method to compare 3 bottles shown but not evaluated to enough accuracy or **M1** for 2 correct comparable values or for a correct method to compare 3 bottles but not evaluated
2(a)(i)	1.5 4 –4 –1.2	**3**	**B2** for 3 correct or **B1** for 1 or 2 correct
2(a)(ii)	Correct graph drawn	**4**	**B3FT** for 12 or 11 correct plots **B2FT** for 10 or 9 correct plots **B1FT** for 8,7 or 6 correct plots

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Question	Answer	Marks	Partial Marks
2(a)(iii)	2	**1**	
2(a)(iv)	$y = x$ oe $y = -x$ oe	**2**	**B1** for each
2(a)(v)	Correct ruled line	**1**	
2(a)(vi)	−2.4	**1**	**FT** *their* graph and $y = 2.5$
2(b)	Correct ruled line	**1**	
2(c)	$[y =]3x + 4$ cao	**2**	**B1** for final answer $[y =]3x + k$, $k \neq 5$ or $[y =]jx + 4$, $j \neq 0$
3(a)(i)	Obtuse	**1**	
3(a)(ii)	113	**1**	
3(b)(i)	Sketch of a rhombus	**1**	
3(b)(ii)	Rhombus cao	**1**	
3(b)(iii)	70, 110, 110	**2**	**B1** for 110 or **M1** for (360 – 70 – 70) ÷ 2 oe or **M1** for $70 + 70 + x + x = 360$ oe soi
3(c)(i)	Angles [in a] triangle add to 180	**1**	
3(c)(ii)	$x + 6y = 180$ oe	**1**	
3(c)(iii)	Correctly eliminating one variable	**M1**	**FT** *their* **(c)(ii)**, if linear in x and y
	$[x =]72$	**A1**	
	$[y =]18$	**A1**	If **M0** scored, **SC1** for 2 values satisfying one of the original equations or *their* equations in **(c)(ii)** **SC1** if no working shown but 2 correct answers given
4(a)(i)	39	**2**	**M1** for 7.8×5 or **B1** for 7.8 and 5 marked on two correct sides of rectangle A
4(a)(ii)	5 7.8 12	**2**	**M1FT** for $\frac{468}{7.8 \times 5}$ oe or for $\frac{468}{\textit{their}}$ **(i)**
4(b)	768π final answer	**2**	**M1** for $\pi \times 8^2 \times 12$ oe

Question	Answer	Marks	Partial Marks
4(c)	45.5 or 45.51 to 45.52	**3**	**M2** for $12\times7-\pi\times3.5^2$ oe or **M1** for 12×7 oe or **M1** for $\pi\times3.5^2$ oe
5(a)	Four points correctly plotted	**2**	**B1** for 2 or 3 points correctly plotted
5(b)	Positive	**1**	
5(c)	Point at (95, 220) indicated	**1**	
5(d)	Ruled line of best fit drawn	**1**	
5(e)	Correct estimate supported by *their* line of best fit and a distance of 310 to 330	**3**	**B2** for 310 to 330 (km) or **B1** for 6.2 to 6.6 seen or **M1** for *their KL*×50
6(a)(i)	0.8	**1**	
6(a)(ii)	He is stationary oe	**1**	
6(a)(iii)	07 12 07 24 gradient is steepest	**2**	**B1** for each
6(a)(iv)	16	**3**	**M2** for $\frac{6.4}{24}[\times60]$ oe or **M1** for $\frac{\textit{their}\ \text{distance}}{\textit{their}\ \text{time}}$
6(b)	32.72 cao	**2**	**M1** for $(1\times12+5\times23+10\times17+25\times9+50\times7+100\times24)[\div100]$ oe or **B1** for 12,115,170,225,350,2400
6(c)	632.8 cao	**1**	
6(d)	578 cao	**2**	**M1** for $8500\times\frac{1.7}{100}[\times4]$ or **B1** for final answer of 9078
7(a)	15 squares shaded	**2**	**B1** for 15 or $\frac{15}{36}$ or **M1** for $\frac{5}{12}=\frac{k}{36}$ oe
7(b)(i)		**1**	

Question	Answer	Marks	Partial Marks
7(b)(ii)	Divisible by 4 oe	**1**	
7(b)(iii)	Justifies why Pierre is correct e.g. $4 \times 25=100$ so the 100th term is a [redacted] the 99th term is the term before since [redacted] is always before [redacted], Pierre is correct.	**2**	**B1** for e.g. 100th term is a [redacted]
7(c)(i)(a)		**1**	
7(c)(i)(b)	8	**1**	**FT** *their* **(c)(i)(a)**
7(c)(ii)		**3**	**B1** for correct labelling **B2** for 6 shapes placed correctly or **B1** for 4 or 5 shapes placed correctly
8(a)(i)	$\frac{360}{8}[=45]$ or $180-\frac{(8-2)\times 180}{8}$ [= 45]	**1**	
8(a)(ii)	135	**1**	
8(b)(i)	135	**1**	
8(b)(ii)	*H, G* or *B*, *E* or *A*, *F*	**1**	
8(b)(iii)(a)	Isosceles	**1**	
8(b)(iii)(b)	22.5	**2**	**M1** for $\frac{180-\textit{their}\textbf{(a)(ii)}}{2}$ oe
8(b)(iii)(c)	292.5	**2**	**M1** for $360-(45+\textit{their}\textbf{(b)(iii)(b)})$ oe or $270+\textit{their}\textbf{(b)(iii)(b)}$ oe
8(c)	14.4	**3**	**M2** for $\frac{1.35}{45}\times 60[\times 8]$ or $\frac{1.35}{45}\times 8[\times 60]$ or **M1** for $\frac{1.35}{45}$ oe If **M0** scored, **SC1** for (figs)144 as final answer

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Question	Answer	Marks	Partial Marks
8(d)	Correct calculation e.g. 1 cm is 5 km or 0.27 cm is 1.35 km or 2.16 cm is 10.8 km leading to no [because] the scale drawing is too small	**2**	**B1** for 1 cm : 5 km or 0.27 cm : 1.35 km or 2.16 cm : 10.8 km
9(a)(i)	Translation $\begin{pmatrix}-7\\-4\end{pmatrix}$	**2**	**B1** for each
9(a)(ii)	Enlargement [centre] $(-1, 0)$ [scale factor] 2	**3**	**B1** for each
9(b)	Shape correctly drawn at (6, –3) (7, –3) (7, 1) (4, 1) (4, –1) (5, –1) (5, 0) (6, 0)	**2**	**B1** for correct 90° anticlockwise rotation about $(6, -3)$ or correct orientation but rotated about the wrong centre

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