Cambridge Assessment International Education

Cambridge IGCSE™

MATHEMATICS **0580/33**

Paper 3 (Core) **May/June 2023**

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.

Cambridge International is publishing the mark schemes for the May/June 2023 series for most Cambridge IGCSE, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

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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)	25	**1**	
1(a)(ii)	$\frac{5}{8}$ cao	**2**	**M1** for $\frac{225}{360}$ oe
1(a)(iii)	1:2:5	**2**	**B1** for 45 : 90 : 225 oe or better
1(a)(iv)	Correct explanation eg if chemistry has an odd number then biology would not be a whole number of students	**1**	
1(a)(v)	65	**2**	**M1** for $\frac{90}{26}=\frac{225}{x}$ oe or better or **M1FT** *their* **(a)(iii)** for $\frac{their5}{their2}\times 26$
1(b)(i)	28	**1**	
1(b)(ii)	14	**1**	
1(b)(iii)	$\frac{9}{28}$ oe	**1**	**FT** $\frac{9}{their\textbf{(b)(i)}}$
1(b)(iv)	6, 8, 10, 4	**1**	
2(a)	8.7[0]	**3**	**M2** for $3.5\times1.2+2\times2.25$ oe or **B2** for 4.2[0] and 4.5[0] or **M1** for 3.5×1.2 oe or 2×2.25 oe
2(b)	1.68 cao	**1**	
2(c)	2.07 cao	**2**	**M1** for $\left(1+\frac{15}{100}\right)\times1.8$ oe or **B1** for 0.27
2(d)(i)	$5+10\times1.5$ [=20]	**1**	

Question	Answer	Marks	Partial Marks
2(d)(ii)	Ruled line from (0, 5) to (10, 20)	**2**	**B1** for one correct point plotted
2(e)	12 1.4[0]	**3**	**M2** for $20-12\times1.55$ oe or **B2** for 18.6 or **M1** for $\frac{20}{1.55}$ soi by 12.9… or 12 in the answer space
2(f)	300	**2**	**B1** for 300*k* as final answer or **M1** for [12 =] 2 × 2 × 3 **and** [50 =] 2 × 5 × 5 or 2 correct factor trees/lists/tables or a list of multiples of both 12 and 50 with at least 3 of each or 2 × 2 × 3 × 5 × 5 or 2,2,3,5,5 or $50\times\frac{12}{50-(12\times4)}$ oe
2(g)	*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
3(a)	9.5	**1**	
3(b)	38	**1**	
3(c)	29	**1**	
3(d)(i)	48	**1**	
3(d)(ii)	Correct dimensions	**1**	
3(e)	352π cao nfww	**3**	**M2** for $\pi20^2-3\times\pi4^2$ oe or **M1** for $\pi20^2$ or $\pi4^2$ oe
3(f)(i)	140	**1**	

Question	Answer	Marks	Partial Marks
3(f)(ii)	16	**4**	**B2** for 108 or **M1** for $180-\frac{360}{5}$ oe or $\frac{(5-2)\times 180}{5}$ oe AND **M1** for $\frac{140-108}{2}$ or $\frac{their\textbf{(f)(i)}-their108}{2}$
4(a)(i)	10 20	**1**	
4(a)(ii)	40	**1**	
4(a)(iii)	Ruled lines from (11 00, 6) to (11 20, 6) and (11 20, 6) to (12 50, 18)	**2**	**B1** for each line If 0 scored, **SC1** for (*their* 11 20, 6) to $(\ their11\ 20+1\frac{1}{2}h\ ,18\ )$
4(a)(iv)	7.2	**3**	**M2** for $\frac{18}{2\frac{30}{60}}$ oe OR **M1** for *their* time at C – 10 20 correctly evaluated **M1** for using $\frac{18}{their\ journey\ time}$
4(b)(i)	[0]65	**1**	
4(b)(ii)	B correctly marked 6.5 cm from X 10 cm from Y	**2**	**B1** for *their* B 6.5 cm from X or 10 cm from Y or 6.5 and 10 soi
4(b)(iii)	104	**2**	**M1** for $284-180$ oe or indicates correct angle on a sketch
5(a)	Correct diagram drawn	**1**	
5(b)	17, 21	**2**	**B1** for each If **B0** scored, **SC1** for $k, k+4$
5(c)(i)	$4n+1$ oe final answer	**2**	**B1** for $4n+k$ or $an+1,\ a\neq 0$ as final answers or for $4n+1$ oe seen and spoilt

Question	Answer	Marks	Partial Marks
5(c)(ii)	18 nfww	**2**	**M1** for $4n+1=73$ or better or **M1** for *their***(c)(i)** = 73
5(d)(i)	$5+9+13[=27]$	**1**	
5(d)(ii)	$2\times3^2+3\times3$ leading to 27 as final answer	**2**	**M1** for $2\times3^2+3\times3$
5(d)(iii)	37	**4**	**M3** for $240-\left(\left(2\times10^2+3\times10\right)-27\right)$ oe or **M2** for $2\times10^2+3\times10-27$ oe or **M1** for $2\times10^2+3\times10$ oe
6(a)	$[y=]-2x+3$ final answer	**2**	**B1** for $-2x + c$ as final answer or **B1** for $mx + 3$, $m \neq 0$, as final answer
6(b)(i)	7, –3, –3, 7	**2**	**B1** for 2 or 3 correct
6(b)(ii)	Correct and accurate curve	**4**	**B3FT** for 7 or 8 correctly plotted points or **B2FT** for 5 or 6 correctly plotted points or **B1FT** for 3 or 4 correctly plotted points
6(c)(i)	$(1.5, k)$ where $-5.5 \leqslant k < -5$	**1**	
6(c)(ii)	Line $x=1.5$ drawn accurately	**1**	
6(c)(iii)	$x=1.5$ oe	**1**	
6(d)	$(3, -3)$	**1**	**FT** *their* curve with line *L*
7(a)(i)	Obtuse	**1**	
7(a)(ii)	72	**1**	
7(a)(iii)	26	**1**	
7(b)	$\frac{180}{3}$	**1**	

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Question	Answer	Marks	Partial Marks
7(c)	9.77 or 9.766…	**3**	**M2** for $[h =]\frac{8}{\cos 35}$ oe or $\frac{8}{\sin 55}$ oe or **M1** for $\cos 35 = \frac{8}{h}$ oe or $\sin 55 = \frac{8}{h}$ oe
7(d)(i)	10.8	**2**	**M1** for $\frac{1.36}{6.12} = \frac{2.4}{PR}$ oe or better
7(d)(ii)	1.76	**2**	**M1** for $\frac{6.12}{1.36} = \frac{7.92}{BC}$ oe or better
7(e)	60	**4**	**M2** for $26^2 - 24^2$ oe or better or **M1** for $26^2 = x^2 + 24^2$ AND **M1** for *their* $10 + 24 + 26$
8(a)	18.65 18.75	**2**	**B1** for each If 0 scored, **SC1** for both correct but reversed or $1865 \leqslant l < 1875$
8(b)	5.86 or 5.862…	**3**	**M2** for $\frac{900}{130500} \times 850$ oe OR **B1** for a correct conversion 130.5 kg=130500 [g] or 900 g =0.9 [kg] or **M1** for $\frac{figs9}{figs130.5} \times 850$
8(c)	1.62×10^4 cao	**2**	**M1** for 2.7×6000 or *their* number correctly converted to standard form
8(d)	0.142 or 0.1416 to 0.1417	**2**	**M1** for $\frac{12.017 - 12}{12}[\times 100]$ or $\left(\frac{12.017}{12} - 1\right)[\times 100]$ or $\frac{12.017}{12} \times 100[-100]$