Cambridge Assessment International Education

Cambridge IGCSE™

MATHEMATICS **0580/32**

Paper 3 (Core) **October/November 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)	80	**1**	
1(a)(ii)	2	**1**	
1(a)(iii)	49	**1**	
1(a)(iv)	27	**1**	
1(a)(v)	2 or 29	**1**	
1(b)(i)	0.004 cao	**1**	
1(b)(ii)	0.00386 cao	**1**	
1(c)	19 300 or 19 280 or 19 279.98 to 19 279.99	**2**	**M1** for $16\,000 \times (1+\frac{3.8}{100})^5$ oe
1(d)(i)	$2 \times 2 \times 2 \times 2 \times 3$ or $2^4 \times 3$	**2**	**B1** for 2, 2, 2, 2, 3 or **M1** for a correct factor tree / diagram / list / table
1(d)(ii)	1008	**2**	**B1** for 1008*k* as final answer or **M1** for $2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 7$ oe or 2, 2, 2, 2, 3, 3, 7 or for [126=] 2×3×3×7 or 2, 3, 3, 7 or [126=] 6×21 and [48=] 6×8 or 6, 21 and 6, 8 or correct factor tree / diagram / list / table for 126 or a list of consecutive multiples of both 48 and 126 with at least 3 of each
1(e)	28.45 28.55	**2**	**B1** for each If 0 scored, **SC1** for both correct but reversed
2(a)(i)	76	**1**	
2(a)(ii)	Acute	**1**	
2(b)(i)	45.6	**2**	**B1** for 5.7 cm or **M1** for *their* 5.7×8
2(b)(ii)	124	**1**	

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Question	Answer	Marks	Partial Marks
2(c)	133 47	**2**	**B1** for each
2(d)	30 and all three angles different oe	**2**	**M1** for 180 – 119 – 31 oe
2(e)	156	**2**	**M1** for $180-\frac{360}{15}$ oe or $\frac{(15-2)\times180}{15}$ oe
2(f)	64, 116, 116	**3**	**B1** for 64 as an answer **B1** for 116 seen or **M1** for (360 – 2 × 64) ÷ 2 oe
3(a)(i)	Bar at 6 with correct width	**2**	**M1** for 24 – 6 – 2 – 7 – 3 oe
3(a)(ii)	Green	**1**	**FT** *their* bar chart
3(a)(iii)	5	**1**	
3(b)	1.4[0] or 1.395 to 1.396	**3**	**M1** for 0.8×7 + 1.2×4 + 1.5×5 + 1.8×6 + 2.4×2 oe **M1dep** for *their* 33.5 ÷ 24
3(c)(i)	7	**2**	**M1** for $\frac{105}{360}\times24$ oe
3(c)(ii)	Correct sector with line at 120°	**2**	**B1** for 120 soi
4(a)	15 984 cao	**4**	**M3** for $(2\times3800 + 3\times2400) \times (1+\frac{8}{100})$ oe or **M2** for [2×]3800 × $(1+\frac{8}{100})$ oe or [3×]2400 × $(1+\frac{8}{100})$ oe or $(2 \times 3800 + 3 \times 2400) \times \frac{8}{100}$ oe or **M1** for 2 × 3800 + 3 × 2400 oe or [*k*×]3800 × $\frac{8}{100}$ oe or [*k*×]2400 × $\frac{8}{100}$ oe where *k* is any integer If **0** scored, **SC1** for *j* × $(1+\frac{8}{100})$ where *j* is any value

Question	Answer	Marks	Partial Marks
4(b)(i)	Thursday and 15 15 or 3 15 pm	**3**	**B1** for Thursday as final answer **B2** for 15 15 as final answer or **B1** for 22 15, [0]3 35, 28h 40, 39 15 If 0 scored, **SC1** for 10 35 + 11 40 + 17
4(b)(ii)	756	**2**	**M1** for 8820 ÷ *their* time
4(c)	11 000 or 10 875 to 11 125	**2**	**B1** for 10 000 to 12 000 as answer or **M1** for 110 × 100 or for a valid method e.g. look up '40' × 2.5
4(d)	24.64 cao	**2**	**M1** for $\frac{154}{21+4} \times k$ where k is 1, 4 or 21 oe
5(a)	$6a + 8b$ or $2(3a + 4b)$ final answer	**2**	**B1** for $6a$ or $8b$ in final answer or correct answer seen then spoilt
5(b)	36 58 73	**4**	**B3** for [Asher]36 or [Brice]58 or [Cara]73 **OR** **M2** for a correct equation which would lead to $4a + 23 = 167$ or for $(167 – 23) \div 4$ oe or **B1** for $2a + 1$ or $a + 22$ seen or $(167 – 23)$ oe **M1** for $4a = 144$ or for rearranging their equation to $ka = j$
5(c)	Correctly equating one set of coefficients	**M1**	
	Correct method to eliminate one variable	**M1**	Dependent on the coefficients being the same for one of the variables Correct consistent use of addition or subtraction using their equations
	$[x =] 9$	**A1**	
	$[y =] -3$	**A1**	If **M0** scored, **SC1** for 2 values satisfying one of the original equations
6(a)(i)	Enlargement (–5, 1) 3	**3**	**B1** for each
6(a)(ii)	Rotation (0, 0) 90° [anti-clockwise]	**3**	**B1** for each

Question	Answer	Marks	Partial Marks
6(a)(iii)	Reflection $y = -2$	**2**	**B1** for each
6(b)	Flag with outline at (1, –3), (1, –2), (1, –1), (2, –1) and (2, –2)	**2**	**B1** for correct translation $\begin{pmatrix} k \\ -4 \end{pmatrix}$ or $\begin{pmatrix} 3 \\ k \end{pmatrix}$
7(a)	A 8	**4**	**B2** for [length =] 6 or **M1** for [area A =] 2 × 12 **M1** for 2 × (2 + 12) oe or 2 × (4 + 24 ÷ 4) oe
7(b)	6.91 or 6.909…	**3**	**M2** for $\sqrt{\frac{150}{\pi}}$ or **M1** for [r^2 =] 150 ÷ π
7(c)	89.0 or 88.98 to 89	**5**	**M4** for $\frac{1}{2} \times 12 \times \sqrt{16^2 - \left(\frac{12}{2}\right)^2}$ oe OR **B3** for [height =] 14.8 or 14.83… or $\sqrt{220}$ or $2\sqrt{55}$ or **M2** for $16^2 - (\frac{12}{2})^2$ oe or better or **M1** for $[...]^2 + (\frac{12}{2})^2 = 16^2$ oe **M1dep** for $\frac{1}{2} \times 12 \times$ *their* 14.8 oe
8(a)(i)	4 –4 –5 –4 4	**3**	**B2** for 3 or 4 correct **B1** for 1 or 2 correct
8(a)(ii)	Correct curve	**4**	**B3FT** for 8 or 9 points correctly plotted **B2FT** for 6 or 7 points correctly plotted **B1FT** for 4 or 5 points correctly plotted
8(a)(iii)	$x = -1$ oe	**1**	
8(a)(iv)	−3.3 to −3.1 1.1 to 1.3	**2**	**FT** *their* graph **B1FT** for each

Question	Answer	Marks	Partial Marks
8(b)	$y = 5x - 2$ final answer	**2**	**B1** for $y = 5x + k$ oe or $y = kx - 2$ oe or $y = 5x + - 2$ oe or $y = kx + - 2$ oe or $5x - 2$ oe or $5x + - 2$ oe
9(a)	3	**1**	
9(b)	1	**1**	
9(c)	Correct fraction e.g. $\frac{7}{50}$	**1**	
9(d)	14	**1**	
9(e)(i)	5.6×10^{6}	**1**	
9(e)(ii)	7.2×10^{-5}	**1**	
9(f)	1.976×10^{5}	**1**	

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