Cambridge Assessment International Education

Cambridge IGCSE™

MATHEMATICS **0580/32**

Paper 3 (Core) **February/March 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.

Cambridge International is publishing the mark schemes for the February/March 2022 series for most Cambridge IGCSE™, Cambridge International A and AS Level 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)	5 23	**1**	
1(a)(ii)	82.1 or 82.14…	**2**	**FT** *their* **(a)(i)** **M1** for $\frac{their23}{their5+their23}[\times 100]$ soi
1(b)(i)	30 2 16 48 47 5 20 72 77 7 36 [120]	**3**	**B2** for 9 or 10 correct or **B1** for 5, 6, 7 or 8 correct
1(b)(ii)	$\frac{7}{10}$ oe	**2**	**M1** for $\frac{120-36}{120}$ oe or **B1** for 84 or for *their*77 +*their* 7
1(c)(i)	150, 90, 120	**2**	**B1** for one correct sector angle or **M1** for $\frac{360}{24}\times k$ k =1, 6, 8 or 10
1(c)(ii)	Correct pie chart drawn	**2**	**FT** *their* table if angles add up to 360 **B1FT** for one sector correctly drawn
2(a)	108	**2**	**M1** for $180-\frac{360}{5}$ or $\frac{(5-2)\times 180}{5}$ oe
2(b)(i)	36 Angles [at a] point [add to] 360	**2**	**B1** for each
2(b)(ii)	72	**2**	**FT** *their* **(b)(i)** **M1** for $\frac{180-their(\mathbf{b})(\mathbf{i})}{2}$
	Angles [in a] triangle add to 180 or Base angles [of an] isosceles triangle are equal	**1**	

Question	Answer	Marks	Partial Marks
2(b)(iii)	1:2	**1**	**FT** *their* **(b)(i)**: *their* **(b)(ii)** provided there has been some simplification
3(a)(i)(a)	Trapezium	**1**	
3(a)(i)(b)	28	**2**	**M1** for a complete method from counting squares e.g. 8 + 16 + 4 or $\frac{(10+4)}{2}\times 4$ oe
	cm^2	**1**	
3(a)(ii)	117	**1**	
3(a)(iii)(a)	Enlargement [centre] $(2,-2)$ [scale factor] 2	**3**	**B1** for each
3(a)(iii)(b)	Rotation [centre] $(-2, 4)$ 90° clockwise oe	**3**	**B1** for each
3(b)	A correct triangle drawn	**2**	**B1** for 18[cm^2] soi
4(a)(i)(a)	Radius	**1**	
4(a)(i)(b)	Chord	**1**	
4(a)(ii)	3.5	**1**	
4(b)	113 or 113.09… to 113.112	**2**	**M1** for $2\times 18\times \pi$ oe
4(c)(i)	90 90	**2**	**B1** for each
4(c)(ii)	For correctly eliminating one variable	**M1**	**M1FT** their two linear equations
	$[x=]7$	**A1**	
	$[y=]9$	**A1**	If **M0** scored, **SC1** for 2 values satisfying one of their original equations If no working shown, **SC1** for two correct answers given
5(a)(i)	Correct ruled net	**3**	**B2** for 4 or 5 correct rectangles drawn in correct positions relative to each other or **B1** for one correct face drawn

Question	Answer	Marks	Partial Marks
5(a)(ii)	25 000	**3**	**M2** for $\frac{100\times100\times100}{2\times4\times5}$ oe or **M1** for $100\times100\times100$ or $0.02\times0.04\times0.05$ or $2\times4\times5$ or 50, 25, 20 If 0 scored, **SC1** for final answer figs 25
5(b)(i)	144	**2**	**M1** for $\frac{\text{figs}135}{750}$ or $\frac{1.35}{\text{figs}750}$ or $\frac{80}{750}$ or $\frac{750}{80}$ oe or **B1** for 1350 or 0.75[0]
5(b)(ii)	2.1	**3**	**M2** for $\frac{3.5\times64\times\text{figs}75}{80}$ oe or **M1** for 3.5×64 or $\frac{80}{64}$
5(c)	7.5×10^{-2} cao	**2**	**M1** for $\frac{75}{1000}$ oe If 0 scored, **SC1** for correctly converting *their* number to standard form, provided *their* number is <1
6(a)(i)(a)	$\frac{1}{9}$ oe	**1**	
6(a)(i)(b)	$\frac{7}{9}$ oe	**1**	
6(a)(ii)	30	**1**	
6(b)(i)	2	**1**	
6(b)(ii)	5	**1**	
6(b)(iii)	3	**1**	
6(b)(iv)	3.35	**3**	**M1** for $1\times15+2\times16+3\times14+4\times11+5\times9+6\times15$ **M1dep** for *their* $\sum fx\div80$

Question	Answer	Marks	Partial Marks
7(a)	9656 cao	**3**	**M2** for $6\times1.609344\times1000$ **or** **M1** for 6×1.609344 or **B1** for final answer figs 9654 to 9660 If 0 scored, **SC1** for their decimal answer correctly rounded to nearest integer
7(b)(i)	142	**2**	**M1** for $322-180$ oe or a clear diagram with both 322 or 38 marked and the reverse bearing to be found
7(b)(ii)	4.54 pm or 16 54	**3**	**M1** for $\frac{12}{5}$ soi **A1** for 2 h 24 [mins]
7(c)(i)	107	**1**	
7(c)(ii)	The position of M correctly marked on the diagram	**4**	**B1** for $SM = 9$[cm] soi **M1** for *their SM* $\times 4\left[\times\frac{1}{5}\right]$ **B1** for 7.2[cm] soi or for bearing of M drawn at 107°
8(a)(i)	-25 0 155	**3**	**B1** for each
8(a)(ii)	Completely correct curve	**4**	**B3FT** for 7 or 8 correctly plotted points **B2FT** for 5 or 6 correctly plotted points **B1FT** for 3 or 4 correctly plotted points
8(a)(iii)(a)	$x=-3$ oe	**1**	
8(a)(iii)(b)	$(-3, k)$ oe where $-180 \leqslant k < -165$	**1**	**FT** *their* graph
8(a)(iv)	10 -16	**2**	**B1 FT** for each
8(b)	$\left[x=\right]\frac{y-c}{m}$ oe final answer	**2**	**M1** for correct first step $y-c=mx$ or $\frac{y}{m}=x+\frac{c}{m}$
9(a)(i)	Complete method shown and evaluated	**2**	**M1** for correct Pythagoras e.g. $120^2+126^2\left[=174^2\right]$

Question	Answer	Marks	Partial Marks
9(a)(ii)	18 090 cao	**5**	**B4** for 18 081 to 18 094.1 OR **M2** for $126 \times \tan 53$ or **M1** for $\tan 53 = \frac{x}{126}$ and **M1** for $\frac{1}{2} \times 120 \times 126$ or $\frac{1}{2} \times 126 \times theirPS$ or $\frac{1}{2} \times 126 \times (120 + theirPS)$ oe If 0 scored, **SC1** for evidence of rounding *their* answer to 4sf
9(b)(i)	4.25 4.35	**2**	**B1** for each If 0 scored, **SC1** for answers correct but reversed
9(b)(ii)	Complete method seen	**1**	e.g. $\frac{3.25 - 2.6}{2.6} \times 100 [= 25]$
9(b)(iii)	2.304	**3**	**M2** for $2.4 \times \frac{100 + 20}{100} \times \frac{100 - 20}{100}$ oe or **M1** for $2.4 \times \frac{100 + 20}{100}$ oe or **B1** for $\frac{100 - 20}{100}$ and $\frac{100 + 20}{100}$ used

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