Cambridge Assessment International Education

Cambridge IGCSE™

MATHEMATICS **0580/33**

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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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.

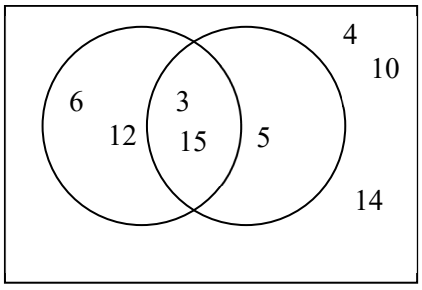
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Maths-Specific Marking Principles	
1	Unless a particular method has been specified in the question, full marks may be awarded for any correct method. However, if a calculation is required then no marks will be awarded for a scale drawing.
2	Unless 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)	Kite	**1**	
1(b)	4	**1**	
1(c)(i)	Enlargement [centre] (−8, 2) [scale factor] 2	**3**	**B1** for each
1(c)(ii)	Translation $\begin{pmatrix} 0 \\ -10 \end{pmatrix}$ OR Reflection in $y = -1$ oe	**2**	**B1** for each
1(d)(i)	Correct rotation (6, −1), (7, −4), (6, −5), (5, −4)	**2**	**B1** for a correct 90° clockwise rotation about (0, 0) or correct orientation, incorrect position
1(d)(ii)	Correct reflection (3, −6), (6, −5), (7, −6), (6, −7)	**2**	**B1** for a correct reflection in $y = 1$ or in $x = k$, $k \neq 1$
2(a)	$A \cup B$	**1**	
2(b)(i)	1 4 9 16	**2**	**B1** for 3 correct and none incorrect or for all correct and one extra incorrect
2(b)(ii)	2, 3, 5, 7, 11, 13	**2**	**B1** for 5 correct and none or one incorrect
2(b)(iii)(a)		**2**	**B1** for 2 or 3 regions correct
2(b)(iii)(b)	7 11 13	**1**	**FT** *their* Venn diagram
2(b)(iii)(c)	2	**1**	**FT** *their* Venn diagram

Question	Answer	Marks	Partial Marks
2(b)(iii)(d)	$\frac{4}{16}$ oe	**1**	**FT** *their* Venn diagram for $\frac{n(F)}{16}$
3(a)	$2 \times 630 + 3 \times \frac{5}{8} \times 630$	**M2**	**M1** for $[3 \times] \frac{5}{8} \times 630$
	2441.25	**A1**	
3(b)(i)	13 [h] 50 [min]	**3**	**B2** for 16[h] 20[min] or 18[h] 50[min] as final answer or 13[h] 50[min] not as final answer or 16[h] 20[min] with – 2[h] 30[min] attempted or 18[h] 50[min] with – 5[h] attempted or **B1** for 21[h] 20[min] seen or 16[h] 20[min] or 18[h]50 [min] seen or 23[h] 50[min] as final answer or an attempt made to find a time of flight
3(b)(ii)	13.833 cao	**1**	**FT** *their* time correct to 3 decimal places
3(b)(iii)	10 038	**1**	
3(b)(iv)	726 or 725.6 to 725.7	**2**	**FT** *their* **(b)(iii)** ÷ *their* **(b)(ii)** correctly evaluated **M1** for *their* **(b)(iii)** ÷ *their* **(b)(ii)**
3(c)	2400 ÷ 8 × (8 + 5 + 6) [=5700]	**M2**	**M1** for 2400 ÷ 8
4(a)(i)	Octagon	**1**	
4(a)(ii)	180 – (360 ÷ 8) or $\frac{(8-2)\times 180}{8}$	**M2**	**M1** for 360 ÷ 8 or (8 – 2) × 180
4(b)(i)	22 29 36	**3**	**B1** for each or **B2FT** for adding 7 twice or **B1FT** for adding 7 between terms once
4(b)(ii)	Add 7 oe	**1**	
4(b)(iii)	64	**1**	
4(b)(iv)	$7n + 1$ oe final answer	**2**	**M1** for $jn + 1, j \neq 0$ or $7n + k, k \neq 1$ or for $7n + 1$ oe seen but not as final answer
4(b)(v)	16 nfww	**2**	**M1** for *their* **(b)(iv)** = 113
5(a)	49	**1**	
5(b)	9002	**1**	

Question	Answer	Marks	Partial Marks
5(c)	−8 and −4	**1**	
5(d)(i)	[0].375	**1**	
5(d)(ii)	37.5	**1**	
5(e)	9	**1**	
5(f)(i)	1024	**1**	
5(f)(ii)	8	**1**	
5(g)(i)	5.87×10^5 cao	**1**	
5(g)(ii)	5.71×10^{-3} cao	**1**	
5(h)	2.425 2.435	**2**	**B1** for each If zero scored, **SC1** for $242.5 \leqslant h < 243.5$ or for both correct but reversed
6(a)(i)	4	**1**	
6(a)(ii)	5	**1**	
6(a)(iii)	3.7	**3**	**M1** for $1\times2 + 2\times7 + 3\times3 + 4\times9 + 5\times4 + 6\times5$ **M1FT**dep for *their* $111 \div 30$
6(b)	Two correct comments with different types of comment	**2**	**B1** for each
6(c)(i)	156 132	**2**	**B1** for each If **B0** scored, **M1** for $\frac{360}{270}$ or for $\frac{72}{54}$
6(c)(ii)	Correct pie chart drawn	**2**	**FT** their table if angles add up to 360° **B1FT** for one correct sector drawn
7(a)	−1 −3 −7.5 7.5 3 1.5 1	**3**	**B2** for 5 or 6 correct **B1** for 3 or 4 correct
7(b)	Correct curve	**4**	**B3FT** for 11 or 12 points correctly plotted **B2FT** for 9 or 10 points correctly plotted **B1FT** for 6, 7 or 8 points correctly plotted
7(c)	2	**1**	
7(d)(i)	Lines $y = x$ and $y = -x$ drawn	**2**	**B1** for each
7(d)(ii)	$y = -x$ oe	**1**	

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Question	Answer	Marks	Partial Marks
7(e)	−2.5	**1**	**FT** *their* intersection of $y = –6$ with *their* graph
8(a)(i)	Isosceles	**1**	
8(a)(ii)	48	**3**	**M2** for $180 – 2 \times (180 – 114)$ oe or **M1** for $180 – 114$ or **B1** for $PQR = 66$ or $PRQ = 66$
8(b)(i)	68 Alternate [angles]	**2**	**B1** for each
8(b)(ii)	22 Angle [between] tangent [and] radius [=] 90°	**2**	**B1** for each
8(b)(iii)	68 with two correct reasons Angle [in a] semicircle [=] 90° Angles [in a] triangle add to 180°	**3**	**B1** for each
8(c)	7.85 or 7.86 or 7.853 to 7.855	**2**	**M1** for $\frac{60}{360} \times 2\pi \times 7.5$ oe
9(a)(i)	65 618	**2**	**M1** for $\frac{3}{100} \times 320\,600$ oe
9(a)(ii)	8.5	**2**	**M1** for $\frac{347851 - 320600}{320600}[\times 100]$ or $\frac{347851}{320600} - 1[\times 100]$ or $\frac{347851}{320600} \times 100\ [-100]$
9(b)	5 : 4 : 2	**2**	**B1** for any correct partial simplification of the ratio
9(c)	1071 cao	**2**	**M1** for $7560 \div 7.06$ If zero scored, **SC1** for their decimal answer correctly rounded to the nearest dollar
9(d)	1261 cao	**3**	**B2** for 9261 as final answer or **M2** for $8000 \times \left(1 + \frac{5}{100}\right)^3 - 8000$ oe or **M1** for $8000 \times \left(1 + \frac{5}{100}\right)^3$ oe

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