Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

MATHEMATICS **0580/33**

Paper 3 (Core) **October/November 2019**

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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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)	[0].25	**1**	
1(b)	$\frac{9}{13}$ cao	**1**	
1(c)	80	**1**	
1(d)	1, 2, 3, 4, 6, 8, 12, 24	**2**	**B1** for 6 or 7 correct factors and no extras or 8 correct factors and at most one extra
1(e)	12	**2**	**B1** for 2, 3, 4 or 6 as final answer or $2 \times 2 \times 3$ or for $2 \times 2 \times 2 \times 3$ and $2 \times 2 \times 3 \times 3 \times 3$
1(f)	Accept any irrational number between 3 and 9	**1**	
1(g)	1	**1**	
1(h)	598.29 cao	**3**	**M2** for $8400 \times \left(1 + \frac{3.5}{100}\right)^2$ oe OR **M1** for $8400 \times \left(1 + \frac{3.5}{100}\right)^2$ oe **A1** for 8998.29
1(i)	$\frac{5}{15}$ or $\frac{12}{15}$ or $\frac{35}{15}$	**B1**	allow denominators with multiples of 15 e.g. $\frac{35k}{15k}$, $\frac{5k}{15k}$
	[2] $\frac{5}{15}$ [+] $\frac{12}{15}$ or $\frac{35}{15}$ [+] $\frac{12}{15}$	**M1**	allow other common denominators
	[2] $\frac{17}{15}$ or $\frac{47}{15}$ leading to $3\frac{2}{15}$ cao	**A1**	with no errors or omissions seen
2(a)(i)	3.5	**2**	**B1** for 1, 1, 2, 2, 3, 3, 4 or 3, 4, 4, 4, 5, 5, 7 or 3 and 4 identified
2(a)(ii)	4	**1**	

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Question	Answer	Marks	Partial Marks
2(a)(iii)	6	**1**	
2(b)(i)	3.76	**3**	**M2** for $(1 \times 3 + 2 \times 1 + 3 \times 5 + 4 \times 8 + 5 \times 6 + 6 \times 2) \div 25$ or **M1** for $1 \times 3 + 2 \times 1 + 3 \times 5 + 4 \times 8 + 5 \times 6 + 6 \times 2$ or 94
2(b)(ii)	$\frac{16}{25}$ oe	**2**	**B1** for 16
2(c)(i)	136 164 36	**2**	**B1** for one correct
2(c)(ii)	Correct pie chart	**2**	**FT** for 1 or 2 marks provided their 3 angles add to 336° **B1** for one correct sector
3(a)	Reflection $y = -1$	**2**	**B1** for each
3(b)	Rotation [centre] (0, 0) oe 90° [anticlockwise] oe	**3**	**B1** for each
3(c)	Correct triangle vertices (0, −2), (3, −2) and (3, 0)	**2**	**B1** for translation of $\begin{pmatrix}-2\\k\end{pmatrix}$ or $\begin{pmatrix}k\\-3\end{pmatrix}$
3(d)	Correct triangle vertices (2, 1), (−1, 1) and (−1, −1)	**2**	**B1** for a correct 180° rotation with incorrect centre
4(a)	22 50	**4**	**M1** for 3840 ÷ 720 **A1** for 5[h] 20[m] **M1dep** for 15 30 + *their* 5[h] 20[m] [+2] or 17 30 + *their* 5[h] 20[m]
4(b)	75	**2**	**M1** for 2610 ÷ 34.8
4(c)	6.5	**3**	**M2** for $\frac{19.17 - 18}{18}$ [× 100] oe or $\left(\frac{19.17}{18} - 1\right)$ [× 100] oe or $\frac{19.17}{18} \times 100$ [– 100] oe or **M1** for $\frac{19.17}{18}$ or 19.17 – 18

Question	Answer	Marks	Partial Marks
4(d)	8	**2**	**M1** for $\frac{36}{2+7}$
5(a)	$4x - 3y$ final answer	**2**	**B1** for $4x$ or $-3y$ or $4x - 3y$ not as final answer
5(b)	−2	**3**	**M1** for $35 = 4 \times a \times 5 + 3 \times 5^2$ or better **M1** for $35 - \textit{their}\ 3 \times 5^2 = \textit{their}\ 4 \times 5 \times a$ or better or **M1** for $P - 3b^2 = 4ab$ or better **M1** for $35 - 3 \times 5^2 = 4 \times 5 \times a$ or better
5(c)(i)	[0].5 or $\frac{1}{2}$	**1**	
5(c)(ii)	2.8 oe	**2**	**M1** for $7x - 2x = 11 + 3$ or better
5(c)(iii)	5	**3**	**M1** for correct first step i.e. $6x - 3$ [= 27] or $2x - 1 = 9$ **M1** for correct second step leading to $ax = b$
5(d)	$[p =] \frac{T}{5} - 2$ or $\frac{T-10}{5}$ final answer	**2**	**M1** for $\frac{T}{5} = p + 2$ oe or $T = 5p + 10$
5(e)	Correct method to eliminate one variable	**M1**	If 0 scored, **SC1** for two values that satisfy one of the original equations or **SC1** if no working shown, but 2 correct answers given
	$[x =] 7$	**A1**	
	$[y =] -1$	**A1**	
6(a)(i)	115	**1**	
6(a)(ii)	63.6	**2**	**B1** for 5.3 [cm]
6(a)(iii)	Correct position of town *C*	**2**	**B1** for indication on diagram of either a bearing of 064° from *A* or a bearing of 028° from *B*
6(b)	[0]65	**2**	**M1** for 245 – 180 oe or for a complete diagram with North lines at *D* and *E* and 245° marked correctly at *E* and 65° marked correctly at *D*
6(c)(i)	*P* *Q*	**1**	

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Question	Answer	Marks	Partial Marks
6(c)(ii)	144	**3**	**M2** for $180 - (360 \div 10)$ oe or $\frac{180 \times (10-2)}{10}$ **M1** for $360 \div 10$ or $180 \times (10 - 2)$ oe
7(a)(i)	112	**2**	**B1** for 14 or 15 or **M1** for $9 + 32 + 24 + 18 +$ *their* 14 + *their* 15 or $2(24 + 32)$
7(a)(ii)	558	**2**	**M1** for $24 \times 18 + 9 \times$ *their* 14 oe or $32 \times 9 + 18 \times$ *their* 15 oe or $32 \times 24 -$ *their* 14 $\times$ *their* 15 oe
7(b)(i)	52	**1**	
7(b)(ii)	52	**1**	**FT** *their* (b)(i)
7(b)(iii)	65	**1**	**FT** $180 - 63 -$ *their* (b)(i) or $180 - 63 -$ *their* (b)(ii)
7(c)	12.4	**3**	**M2** for $(18.6 \times 16.4 \times 10.2) \div (30.6 \times 8.2)$ oe or **M1** for $18.6 \times 16.4 \times 10.2$ or 3111.408 or $30.6 \times 8.2 \times h$ or $250.92h$
7(d)	68 nfww	**2**	**M1** for $\frac{48}{6}$ or $\frac{6}{48}$ or $\frac{8.5}{6}$ or $\frac{6}{8.5}$ oe
8(a)(i)	3 3	**1**	
8(a)(ii)	Correct curve	**4**	**B3FT** for 6 or 7 points correctly plotted or **B2FT** for 4 or 5 points correctly plotted or **B1FT** for 2 or 3 points correctly plotted
8(b)(i)	27	**1**	
8(b)(ii)	Add 6 oe	**1**	
8(b)(iii)	$6n - 3$ oe final answer	**2**	**B1** for $6n + a$ or $bn - 3$ ($b \neq 0$)
9(a)	$\frac{10+30}{[0].4 \times 5}$	**M1**	
	$\frac{40}{2}$ [= 20]	**A1**	
9(b)	$\frac{333}{106}$ 3.1416 3.142 $\frac{22}{7}$	**2**	**B1** for 3.1428[…] or 3.143 and 3.1415[…] or for 3 in the correct order

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Question	Answer	Marks	Partial Marks
9(c)	9.75 9.85	**2**	**B1** for one correct or both correct and reversed
9(d)	4.1×10^{-4} cao	**2**	**B1** for $4.07[6\ldots] \times 10^{-4}$ or 4.08×10^{-4} or figs 41

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