Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

MATHEMATICS **0580/32**

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)(i)	Friday	**1**	
1(a)(ii)	25	**1**	
1(a)(iii)	15	**1**	
1(b)	58.5	**2**	**B1** for 21 [hours] or 37.5 [hours] or 9.75 [hours] soi or **M1** for $6\left(3\frac{1}{2}+6\frac{1}{4}\right)$ oe
1(c)	2302.8[0] final answer	**2**	**M1** for $(4 \times 38 + 2 \times 25) \times 11.40$ oe
1(d)	120	**3**	**M2** for $\frac{48}{4}\times(5+4+1)$ oe or **M1** for $\frac{48}{4}$ soi by 12
1(e)	68.5	**4**	**M1** for $35 \times 22 + 5 \times 14.5$ oe **M2** for $\frac{\textit{their}\,842.50-500}{500}$ [× 100] or $\left(\frac{\textit{their}\,842.50}{500}-1\right)$ [× 100] or $\frac{\textit{their}\,842.50}{500}\times 100$ [– 100] or **M1** for $\frac{\textit{their}\,842.50}{500}$ or *their* 842.50 – 500
2(a)	47.85 15[.00] 65.75	**2**	**B1** for one of first two values correct
2(b)(i)	12.9	**2**	**M1** for $1.8 \times 5.3 + 2.4 \times (3.2 - 1.8)$ oe or $3.2 \times 2.4 + 1.8 \times (5.3 - 2.4)$ oe or $5.3 \times 3.2 - (5.3 - 2.4) \times (3.2 - 1.8)$ oe
2(b)(ii)	806.25	**2**	**FT** *their* (b)(i) × 62.5 **M1** for *their* (b)(i) ÷ 8 × 500 oe

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Question	Answer	Marks	Partial Marks
2(c)	160 100	**2**	**B1** for each or for 4 and 2.5 seen
2(d)	4.05	**2**	**M1** for $\frac{1}{2}\times(1.9+2.6)\times 1.8$ oe
2(e)	251 or 251.3 to 251.4	**2**	**M1** for $\pi \times 80$ oe
3(a)(i)	1, 2, 3, 6, 9, 18	**2**	**B1** for 4 or 5 correct and no extras or 6 correct and one extra
3(a)(ii)	36 or 49	**1**	
3(a)(iii)	97	**1**	
3(b)(i)	$24 \div (6 + 2) \times 3$	**1**	
3(b)(ii)	$24 \div (6 + 2 \times 3)$	**1**	
3(c)	2.33 nfww	**2**	**B1** for 2.32[648…] If 0 scored, **SC1** for rounding *their* answer given to 3dp or more correctly to 2dp
3(d)(i)	18	**2**	**B1** for 2 or 3 or 6 or 9 or $2 \times 3 \times 3$ as final answer or for [36 =] $2 \times 2 \times 3 \times 3$ or $2^2 \times 3^2$ and [90 =] $2 \times 3 \times 3 \times 5$ or $2 \times 3^2 \times 5$
3(d)(ii)	180	**2**	**B1** for answer $180k$ where k is a positive integer or $2 \times 2 \times 3 \times 3 \times 5$
3(e)(i)	[0].0042	**1**	
3(e)(ii)	8.89×10^5	**2**	**B1** for figs 889
4(a)(i)	Table completed correctly 0 | 𝍸 /// | 8 1 | 𝍸 / | 6 2 | 𝍸 𝍸 | 10 3 | 𝍸 𝍸 // | 12 4 | 𝍸 /// | 8 5 | 𝍸 / | 6	**2**	**B1** for tallies correct or frequencies correct If 0 scored, **SC1** for correct frequency for *their* tallies
4(a)(ii)	5	**1**	
4(a)(iii)	3	**2**	**B1** for 25[th] and 26[th] seen or these values identified

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Question	Answer	Marks	Partial Marks
4(a)(iv)	16	**1**	**FT** *their* table (*their* 8 × 2)
4(a)(v)	$\frac{7}{25}$ final answer	**2**	**B1FT** for $\frac{their\,8 + their\,6}{50}$ oe seen
4(b)	750	**2**	**B1** for 0.75[litres] 2000 [ml] or 0.25 [litres] or 1250 [ml] or 1.25 [litres] soi
4(c)	1.45 , 1.55	**2**	**B1** for one value correct or for both values correct but reversed
4(d)	577 or 577.2 to 577.3…	**3**	**M2** for $\pi \times \left(\frac{7}{2}\right)^2 \times 15$ or **M1** for $\pi \times \left(\frac{7}{2}\right)^2$ If 0 scored, **SC1** for $\pi \times 7^2 \times 15$
5(a)(i)	Correct triangle with correct arcs	**2**	**B1** for correct triangle with incorrect/no arcs or for two correct arcs seen If 0 scored, **SC1** for triangle with arcs but with $AC = 5$ cm and $BC = 7$ cm
5(a)(ii)	Angle *ABC* measured correctly	**1**	STRICT **FT** *their* angle *ABC*
5(b)(i)	57	**2**	**M1** for 180 – 32 – 25 oe or 123
5(b)(ii)	98	**2**	**M1** for 180 – 25 – *their* (b)(i) oe or 180 – 2 × *their* (b)(i) + 32 or **B1** for angle *PSQ* = 66
5(c)(i)	27	**2**	**M1** for $180 - 90 - 63$ oe or **B1** for angle *FDE* = 90 soi
5(c)(ii)	5.45 or 5.447 to 5.448	**2**	**M1** for $\cos 63 = \frac{DF}{12}$ or $\sin 27 = \frac{DF}{12}$ oe
6(a)	9, 3, 9	**2**	**B1** for two correct
6(b)	Correct 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)	0.6 to 0.8, 4.2 to 4.4	**2**	**FT** *their* curve **B1** for each

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Question	Answer	Marks	Partial Marks
7(a)(i)	12	**1**	
7(a)(ii)	Subtract 5 oe	**1**	
7(b)	3 8 15	**2**	**B1** for two correct in correct positions If 0 scored, **SC1** for 0 3 8
7(c)(i)	10 14 18 22	**2**	**B1** for 2 or 3 correct
7(c)(ii)	$4n + 2$ oe final answer	**2**	**B1** for $4n + j$ or $kn + 2$, $k \neq 0$
7(c)(iii)	All patterns use an even number of lines oe	**1**	
8(a)(i)	(–2, –5)	**1**	
8(a)(ii)	$\begin{pmatrix} -3 \\ 2 \end{pmatrix}$	**1**	
8(b)(i)	Enlargement [SF] 2 [Centre] (5, 3)	**3**	**B1** for each
8(b)(ii)	Correct translation Vertices (5, 2), (5, –1), (6, 1)	**2**	**B1** for translation by $\begin{pmatrix} 4 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ -2 \end{pmatrix}$
8(b)(iii)	Correct rotation Vertices (1, –1), (4, –1), (3, –2)	**2**	**B1** for correct orientation, incorrect position or for 90° anticlockwise rotation about (0, 0)
9(a)(i)	46	**2**	**M1** for $5 \times 8 - 2 \times -3$ or better
9(a)(ii)	$\frac{c+2b}{5}$ oe or $\frac{c}{5}+\frac{2b}{5}$ oe final answer	**2**	**M1** for $c + 2b = 5a$ oe or $\frac{c}{5} = a - \frac{2b}{5}$ oe
9(b)	$3(x + 4)$ final answer	**1**	
9(c)	$2xy + x^2$ final answer	**2**	**B1** for $2xy$ or x^2 or for $2xy + x^2$ not as final answer
9(d)	$n + 2n + 2n + 3 = 58$ or $5n + 3 = 58$ leading to [n =] 11	**4**	**M2** for any correct equation which would lead to $5n + 3 = 58$ or **B1** for $2n$ or $2n + 3$ seen **M1** for $5n = 55$ or for rearranging *their* linear equation to $an = b$ **B1** for [n =]11

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