Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

MATHEMATICS **0580/32**

Paper 3 (Core) **March 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)	Swimming	**1**	
1(a)(ii)	$\frac{72}{360}$ oe	**1**	
1(a)(iii)	5 cao	**2**	**M1** for $\frac{30}{360}[\times 60]$ or $\frac{60}{360}[\times 30]$ or for $\frac{360}{60}$ soi by 6
1(a)(iv)	$\frac{55}{60}$ oe	**1**	**FT** $\frac{60-\textit{their}\textbf{(a)(iii)}}{60}$ oe
1(a)(v)	Tennis, Judo	**1**	
1(b)	2 sectors drawn: Running 60° Swimming 132°	**2**	**M1** for use of 12° implied by 60° or 132° seen or for 10 [boys] or 22 [boys] seen
1(c)	A valid correct similarity and difference	**2**	**B1** for each
2(a)	$\frac{4}{15}$ cao	**2**	**M1** for $\frac{8}{30}$
2(b)	$\frac{7k}{12k}$ $k \neq 1$	**1**	
2(c)	$\frac{11k}{13k}$	**1**	
2(d)	Any correct fraction	**1**	
2(e)	5.7×10^{-1}, $\frac{4}{7}$, 57.2% , $\sqrt{0.33}$	**2**	**B1** for 3 in correct order **M1** for 3 of 0.57, 0.571[….], 0.574[….], 0.572

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Question	Answer	Marks	Partial Marks
3(a)	6 : 5 : 4	**2**	**M1** for 1200 : 1000 : 800 or better
3(b)	204000	**2**	**M1** for $240000\times\left(1-\frac{15}{100}\right)$ oe
3(c)	832 or 831.5 or 831.53 or 831.54 or 831.538…	**3**	**M2** for $750\times\left(1+\frac{3.5}{100}\right)^3$ oe or **M1** for $750\times\left(1+\frac{3.5}{100}\right)^2$ oe
4(a)	800	**2**	**M1** for $\frac{10}{10+1}[\times 880]$ or $\frac{880}{10+1}[\times 10]$ oe
4(b)	220	**1**	
4(c)	$\frac{31}{40}$ or equivalent fraction	**3**	**M2** for $1-\left(\frac{1}{40}+\frac{1}{5}\right)$ oe or **M1** for $\frac{1}{40}+\frac{1}{5}$ oe OR **B2** for 682 or **M1** for $\frac{1}{40}\times 880$ soi by 22 or $\frac{1}{5}\times 880$ soi by 176
4(d)(i)	4.5[0]	**1**	
4(d)(ii)(a)	09 50	**1**	
4(d)(ii)(b)	11.5[0]	**1**	
4(d)(iii)	6.5[0]	**3**	**B2** for 32.5 or **M2** for ([0] + 8.5 + 12 + 12) – 26 or **M1** for [0] + 8.5 + 12 + 12
5(a)	4 tables and 14 chairs correctly drawn	**1**	
5(b)	14, 16, 18	**2**	**B1** for 2 correct or k, $k+2$, $k+4$
5(c)	$2t+6$ oe final answer	**2**	**B1** for $2t+j$ or $kt+6$, $k\neq 0$
5(d)	42 cao	**2**	**M1** for 18 correctly substituted into *their* **(c)**, provided a linear expression
5(e)	37 cao	**2**	**M1** for *their* **(c)** $=80$

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Question	Answer	Marks	Partial Marks
6(a)	55	**1**	
6(b)	108	**2**	**M1** for $\frac{18}{10}\times[60]$ oe
6(c)	Correct graph Ruled lines (09 55, 31.5) to (10 30, 31.5) (10 30, 31.5) to (10 50, 30) (10 50, 30) to (11 10, 12) (11 10, 12) to (11 20, 12) (11 20, 12) to (11 35, 0)	**4**	**B1** for ruled lines (09 55, 31.5) to (10 30, 31.5) and (10 30, 31.5) to (10 50, 30) **B1** for ruled line from (*their*10 50, 30) to (*their* 10 50+20, 12) **B1** for ruled line from (*their* 11 10, 12) to (*their* 11 10+10, 12) **B1** for ruled line (*their*11 20, 12) to (*their*11 20+15, 0) or for 15 mins soi
7(a)	19.2	**2**	**B1** for 9.6 cm seen
7(b)	[0]45	**1**	
7(c)	Correct ruled perpendicular bisector with 2 pairs of arcs	**2**	**B1** for correct bisector drawn without arcs or for two pairs of correct arcs
7(d)	*K* marked correctly twice	**4**	**B1** for line indicating correct bearing of 203° measured **B2** for an arc radius 4.4 cm, centre *T*, the arc length being fit for purpose or **B1** for an arc of any radius, centre *T* or **M1** for 8.8 ÷ 2 soi by 4.4 *K* marked correctly once implies 3 marks
7(e)	138	**2**	**M1** for $318-180$ or a correct diagram seen

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Question	Answer	Marks	Partial Marks
8(a)	$[y =] -\frac{1}{2}x + 3$	**3**	**B2** for $[y =] -\frac{1}{2}x + c$ or **M1** for $\frac{rise}{run}$ or $m = \pm\frac{1}{2}$ oe and **B1** for $[y =] kx + 3$, $k \neq 0$ or $c = 3$
8(b)(i)	–1	**2**	**M1** for $[a =] \frac{2}{3} \times 9 - 7$ or better
8(b)(ii)	15	**2**	**M1** for $3 = \frac{2}{3}b - 7$ or better
8(c)(i)	–28, –4, 2	**3**	**B1** for each
8(c)(ii)	correct smooth curve	**4**	**B3FT** for 6 or 7 correct plots or **B2FT** for 4 or 5 correct plots or **B1FT** for 2 or 3 correct plots
8(c)(iii)	(1.5 , 2.25)	**1**	accept (x, y) where $1 < x < 2$ and $2 < y < 4$
9(a)(i)	15	**2**	**B1** for 4 cm or 8 cm
9(a)(ii)	428 or 429 or 428.4 or 428.5 or 428.49 to 428.52	**3**	**M2** for $120 \times 2 + 60\pi$ or **M1** for 60π If 0 scored **SC1** for 28.6 or 28.56 to 28.57
9(a)(iii)	5 minutes 6 seconds	**3**	**FT** *their* **(a)(ii)** **M1** for $\frac{\textit{their}\ \textbf{(a)(ii)}}{1.4}$ **M1dep** for ÷ 60
9(b)(i)	45	**2**	**M1** for $\frac{60 \times 60}{80}$ oe
9(b)(ii)	11, 10	**3**	**B2** for 880 or $8 \times 10 \times 11$ oe or **B1** for $880k$, $k > 1$ or **M1** for 80, 160, 240.. and 88, 176, 264,… or 8×10 and 8×11 seen

Question	Answer	Marks	Partial Marks
10(a)	correct triangle drawn with arcs	**2**	**B1** for correct triangle without arcs or for correct arcs
10(b)	280	**2**	**M1** for $\frac{1}{2}(24+16)\times 14$ oe
10(c)	20	**3**	**M2** for $\frac{360}{180-162}$ or better or **M1** for $180-162$ or $(n-2)\times 180 = 162n$ or better
10(d)	11	**3**	**M2** for $h^2 = \frac{363}{3}$ or better or **M1** for $\frac{1}{2}\times h \times 6h = 363$ oe
10(e)	62.8 or 62.83 to 62.84	**3**	**M2** for $\frac{1}{2}\pi\times 7^2 - \frac{1}{2}\pi\times 3^2$ oe or **M1** for $\left[\frac{1}{2}\times\right]\pi\times 7^2$ or $\left[\frac{1}{2}\times\right]\pi\times 3^2$

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