Cambridge Assessment International Education

Cambridge IGCSE® (9–1)

MATHEMATICS **0980/03**

Paper 3 (Core) **For examination from 2020**

MARK SCHEME

Maximum Mark: 104

Specimen

This document has **8** pages. Blank pages are indicated.

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.

MARK SCHEME NOTES

The following notes are intended to aid interpretation of mark schemes in general, but individual mark schemes may include marks awarded for specific reasons outside the scope of these notes.

Types of mark

M Method mark, awarded for a valid method applied to the problem.
A Accuracy mark, given for a correct answer or intermediate step correctly obtained. For accuracy marks to be given, the associated Method mark must be earned or implied.
B Mark for a correct result or statement independent of Method marks.

When a part of a question has two or more 'method' steps, the **M** marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several **B** marks allocated. The notation 'dep' is used to indicate that a particular **M** or **B** mark is dependent on an earlier mark in the scheme.

Abbreviations

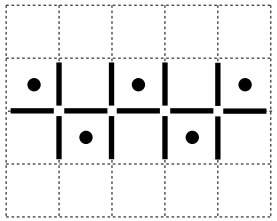
cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
nfww	not from wrong working
oe	or equivalent
SC	special case
soi	seen or implied

Question	Answer	Marks	Partial Marks
1(a)(i)	11 04	**1**	
1(a)(ii)	11 50	**1**	**FT**
1(a)(iii)	38	**1**	
1(b)	4.5	**1**	
1(c)(i)	2.2	**2**	**B1** for 11 or 2200 seen
1(c)(ii)	150°	**1**	
1(c)(iii)	Correct position	**2**	**B1** for bearing 195° **B1** for distance 2.5 cm
1(c)(iv)	3770 or 3769.9 to 3770.4	**4**	**B2** for diameter 1200 [metres] soi or **B1** for diameter 6 [cm] soi **M1** for π × *their* diameter soi

Question	Answer	Marks	Partial Marks
2(a)(i)	21 or 28	**1**	
2(a)(ii)	16 or 81	**1**	
2(a)(iii)	27	**1**	
2(a)(iv)	17 or 61 or 67 or 71	**1**	
2(b)	$7 \times (5 - 2 + 3) = 42$	**1**	
2(c)(i)	$2^2 \times 3 \times 5$ or $2 \times 2 \times 3 \times 5$	**2**	**B1** for prime factors 2, 3 and 5 (and no others) identified or a correct product e.g. 6×10, 4×15, 5×12, $4 \times 3 \times 5$ etc.
2(c)(ii)	180	**2**	**M1** for $2 \times 2 \times 3 \times 3$ or $2^2 \times 3^2$ or **B1** for any other multiple of 180 or for listing at least 5 multiples of each with maximum one error
2(d)	0.9 or $\frac{9}{10}$	**1**	

Question	Answer	Marks	Partial Marks
3(a)(i)	$\frac{2}{5}$ oe	**1**	Allow 0.4, 40%
3(a)(ii)	$\frac{3}{5}$ oe	**1**	Allow 0.6, 60%
3(a)(iii)	0	**1**	
3(b)(i)	4	**1**	
3(b)(ii)	4.3	**3**	**M1** for $2 \times 3 + 3 \times 2 + 4 \times 6 + 5 \times 4 + 6 \times 5$ or 86 **M1** for *their* $86 \div 20$ If M0M0 **SC1** for 57.5
3(b)(iii) (a)	$\frac{3}{20} \times 360$	**1**	
3(b)(iii) (b)	90	**2**	**M1** for $\frac{5}{20}$ oe or $\frac{360}{20}$ oe implied by 18 seen
3(c)(i)	14	**2**	**M1** for $\frac{168}{360}$ oe or $\frac{360}{30}$ oe implied by 12 seen
3(c)(ii)	43.3	**3**	**B1** for [total angle =] 156° **M1** for $\frac{\textit{their}\ \text{angle}}{360}$ [× 100] oe If B0M0 **SC1** for 53.3
3(c)(iii)	5	**2**	**M1** for $\frac{10}{100} \times 360$ oe or 36

Question	Answer	Marks	Partial Marks
4(a)(i)	9 : 4	**1**	
4(a)(ii)	7	**2**	**M1** for $\frac{3}{5} \times 45$ or $45 : 3 \times 9$
4(b)(i)	4745 cao	**3**	**B2** for 4744.9… or **M1** for $\left(1+\frac{4}{100}\right)^6$
4(b)(ii)	37	**2**	**M1FT** for *their* $\frac{4745}{126}$
	83	**2**	**M1FT** for *their* 4745 – 126 × *their* 37 or $\left(\textit{their}\ \frac{4745}{126} - \textit{their}\ 37\right) \times 126$
4(c)	17.28	**1**	

Question	Answer	Marks	Partial Marks
5(a)		**1**	
5(b)	4 5 11 10 13 31	**4**	**B1** for 11 **B1** for 31 **B2** for 4, 5, 10, 13 or **B1** for two of 4, 5, 10, 13
5(c)(i)	$n + 1$ oe final answer	**1**	
5(c)(ii)	$3n + 1$ oe final answer	**2**	**B1** for $3n + k$ or $cn + 1$ $c \neq 0$
5(d)	26	**2**	**M1FT** for *their* **(c)(ii)** = 76 or better or **M1** implied by answer of 25

Question	Answer	Marks	Partial Marks
6(a)(i)	8	**1**	
6(a)(ii)	–2	**3**	**M1** for first step correctly identified **M1FT** for second step correctly identified
6(b)(i)	$19x + 117$	**2**	**B1** for $19x + c$ or $mx + 117$
6(b)(ii)	$15x + 625$ = *their* **(b)(i)**	**1**	
	127	**2**	**M1FT** for first step of *their* linear equation

Question	Answer	Marks	Partial Marks
7(a)	$-5x + 6$	**3**	**B2** for $-5x$ (oe) + 6 or $-5x + k$ or **B1** for $kx + 6$ $k \neq 0$ or [gradient =] $\frac{\text{rise}}{\text{run}}$ with correct values or [gradient =] $\pm 5\frac{k}{k}$
7(b)(i)	3 12	**2**	**B1** for each
7(b)(ii)	Correct curve	**4**	**B3FT** for 5 or 6 correctly plotted points or **B2FT** for 3 or 4 correctly plotted points or **B1FT** for 1 or 2 correctly plotted points
7(c)	0.2 to 0.35	**1**	**FT**

Question	Answer	Marks	Partial Marks
8(a)(i)	35	**1**	
8(a)(ii)	74	**1**	
8(b)	43 **and** valid reasons	**3**	Reasons include exterior angle [of a triangle] equals the sum of the interior opposite angles or angles on a straight line [sum to 180] and angles in a triangle [sum to 180] **B2** for 43 or **M1** for 180 – 128 soi by 52 or 128 – 85 **B1** for valid reasons
8(c)	32.2 or 32.23…	**2**	**M1** for sin […] = 8 ÷ 15 oe
8(d)(i)	$[AB] = \sqrt{300^2 + 225^2}$	**2**	**M1** for $300^2 + 225^2$
8(d)(ii)	15 35	**4**	**M1** for 375 ÷ 450 or [0].833[…] **M1** for *their* [0].833 × 60 or soi by 50 **M1** for 14 45 + *their* 50 soi

Question	Answer	Marks	Partial Marks
9(a)(i)	rotation [centre] (6, 7) 180° oe	**3**	**B1** for enlargement **B1** for SF = –1 **B1** for centre (6, 7)
9(a)(ii)	reflection	**B1**	
	$x = 1$	**B1**	
9(a)(iii)	enlargement	**B1**	
	[centre] (6, 11)	**B1**	
	scale factor 2	**B1**	
9(b)	correct translation shown	**2**	**B1** for translation by $\begin{pmatrix}-3\\k\end{pmatrix}$ or $\begin{pmatrix}k\\2\end{pmatrix}$
9(c)	No shapes are congruent to *D* as they are not the same size oe	**1**	