Cambridge Assessment International Education

Cambridge IGCSE™

MATHEMATICS **0580/33**

Paper 3 (Core) **October/November 2020**

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.

Cambridge International is publishing the mark schemes for the October/November 2020 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

© UCLES 2020

[Turn over

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.

© UCLES 2020

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.

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

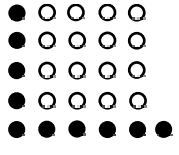
© UCLES 2020

Question	Answer	Marks	Partial Marks
1(a)(i)	Two thousand [and] sixty-seven	**1**	
1(a)(ii)	2100	**1**	
1(b)	22 : 9	**1**	
1(c)	95	**1**	
1(d)	4 nfww	**2**	**M1** for $\frac{4784-4600}{4600}$ [$\times 100$] or $\left(\frac{4784}{4600}-1\right)$ [$\times 100$] or $\frac{4784}{4600}\times 100$ [-100] oe
1(e)	1.53×10^8	**1**	
1(f)(i)	$\frac{90}{360}\times 480$ [= 120] oe	**1**	
1(f)(ii)(a)	51 75	**2**	**M1** for either $\frac{68}{480}\times 360$ or $\frac{100}{480}\times 360$ oe or better
1(f)(ii)(b)	Correct pie chart	**1**	**FT** dep on *their* 51° and *their* 75° adding to 126°
2(a)(i)	69	**1**	
2(a)(ii)	60	**1**	
2(a)(iii)	72	**1**	
2(a)(iv)	81	**1**	
2(a)(v)	59 or 61 or 67 or 71 or 73 or 79 or 83	**1**	
2(b)	$2^2 \times 5 \times 11$ or $2 \times 2 \times 5 \times 11$	**2**	**B1** for 2, 2, 5, 11 or **M1** for correct factor tree/diagram/list/ table
3(a)	–5, 7, 5	**2**	**B1** for 2 correct
3(b)	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
3(c)(i)	Ruled line $y = 3$	**1**	

Question	Answer	Marks	Partial Marks
3(c)(ii)	0.3 to 0.6 4.4 to 4.7	**2**	**FT** *their* $y = k$ and *their* **(b)** **B1** for one correct or **B1** for both correct answers as coordinates
4(a)	112.17	**3**	**M2** for $14.6 \times 10.9 - (14.6 - 8.5) \times (10.9 - 3.2)$ oe or **M1** for a correct method to find one of the six areas or **B1** for 7.7 or 6.1 soi
4(b)	135 or 135.26 to 135.3	**3**	**M1** for $\frac{4.25}{\pi}$ oe **B1** for *their* answer in metres seen correctly converted to cm or 425 [cm] seen
4(c)	17 000 or 16 960 to 16 970	**2**	**M1** for $\pi \times 15^2 \times 24$ oe
4(d)	26.4	**2**	**M1** for $\frac{21.6}{h} = \frac{27}{33}$ oe or better
4(e)	Medium With correct comparisons made of the 3 bags with suitable accuracy shown	**3**	**M2** for 3 correct consistent divisions shown but either not evaluated to enough accuracy or wrong bag selected or **M1** for 2 correct consistent divisions shown for 2 bags
5(a)(i)	7.8	**1**	
5(a)(ii)	81	**2**	**M1** for an ordered list of at least the first 6 or last 6 values or **B1** for 77 and 85 both identified
5(b)(i)	Points plotted at (90, 11.0) and (110, 9.4)	**1**	
5(b)(ii)	Negative	**1**	
5(b)(iii)	[The] greater [the maximum] power the less time [needed to accelerate from 0 to 100 km/h] oe	**1**	
5(b)(iv)	Correct ruled line	**1**	
5(b)(v)	12.5 to 13.5	**1**	**FT** from *their* line provided negative gradient

© UCLES 2020

Question	Answer	Marks	Partial Marks
5(c)	487.5[0] cao	**3**	**M2** for $\frac{18160-6460}{24}$ or better or **M1** for 18 160 – 6460
5(d)	85.02 cao	**3**	**M2** for $0.75 \times 52 \times 2.18$ oe or **M1** for 0.75×52 oe soi by 39 or for 52×2.18 soi by 113.36 If 0 scored, **SC1** for $0.25 \times 52 \times 2.18$ oe
6(a)(i)(a)	Triangle at (4, –2) (5, –2) (5, –4)	**2**	**B1** for $\begin{pmatrix}3\\k\end{pmatrix}$ or $\begin{pmatrix}k\\-7\end{pmatrix}$
6(a)(i)(b)	Triangle at (4, 5) (5, 5) (4, 3)	**2**	**B1** for reflection in $x = k$ or $y = 3$
6(a)(ii)	Rotation 90° [anticlockwise] oe [centre] (0, 0) oe	**3**	**B1** for each
6(a)(iii)	Enlargement [SF =] 3 [centre] (4, 4)	**3**	**B1** for each
6(b)(i)	$\begin{pmatrix}8\\5\end{pmatrix}$	**1**	
6b(ii)	$\begin{pmatrix}7\\-1\end{pmatrix}$	**2**	**B1** for $\begin{pmatrix}5\\7\end{pmatrix}-\begin{pmatrix}-2\\8\end{pmatrix}$ or $\begin{pmatrix}5\\7\end{pmatrix}+\begin{pmatrix}2\\-8\end{pmatrix}$ or answer $\begin{pmatrix}7\\k\end{pmatrix}$ or $\begin{pmatrix}k\\-1\end{pmatrix}$
6(c)	(2, 3)	**1**	
7(a)	28	**2**	**M1** for $3 \times 6 + 5 \times 2$ or better or **B1** for 18 or 10 seen
7(b)	$4b(3 + 2b)$ final answer	**2**	**B1** for final answer $2(6b + 4b^2)$ or $4(3b + 2b^2)$ or $2b(6 + 4b)$ or $b(12 + 8b)$ or $4b(3 + 2b)$ seen then spoilt
7(c)	$\frac{y+p}{4}$ or $\frac{y}{4}+\frac{p}{4}$ oe final answer	**2**	**M1** for $4m = y + p$ or $\frac{y}{4} = m - \frac{p}{4}$
7(d)	9 cao	**1**	
7(e)(i)	1	**1**	

Question	Answer	Marks	Partial Marks
7(e)(ii)	$\frac{1}{25}$ or 0.04	**1**	
7(f)	6.5	**5**	**M2** for $10x + 8 = 33$ or $5x + 4 = 16.5$ or **M1** for $[2\times]\ (3x - 1 + 2x + 5)$ oe **M1** for a correct first step in solving *their* linear equation **A1** for $[x =]\ 2.5$ If **A0** scored, **SC1** for $3x - 1$ correctly evaluated **FT** *their* positive x
8(a)(i)	Chord	**1**	
8(a)(ii)	Angle [between] tangent [and] radius [is] 90°	**1**	
8(a)(iii)	106	**3**	**M1** for $90 - 53$ soi by 37 **M1** for $180 - 2 \times$ *their* angle *OPQ*
8(b)(i)	48 corresponding	**2**	**B1** for 48
8(b)(ii)	67 angles [on a straight] line [add to] 180	**2**	**B1** for 67
8(b)(iii)	115	**2**	**B1** for 65 or 115 seen in correct position
8(c)	17.5 or 17.49…	**3**	**M2** for $[x =]\ \frac{11.8}{\tan 34}$ or $[x =]\ 11.8 \tan 56$ or **M1** for $\tan [34] = \frac{11.8}{x}$ or $\tan 56 = \frac{x}{11.8}$
9(a)		**1**	
9(b)	10 12 16 25	**2**	**B1** for 2 or 3 correct
9(c)(i)	$2n + 2$ oe final answer	**2**	**B1** for $2n + c$ or $kn + 2$, $(k \neq 0)$ as final answer or for $2n + 2$ seen then spoilt
9(c)(ii)	n^2	**1**	

Question	Answer	Marks	Partial Marks
9(d)	No with a correct supporting reason	**2**	**M1** for 12 substituted into *their* $2n + 2$ or *their* n^2 or 26 [black] or 144 [white] or $\sqrt{140} = 11.8...$ [white]