Cambridge Assessment International Education

Cambridge IGCSE™

MATHEMATICS **1521/32**

Paper 3 (Core) **May/June 2021**

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 May/June 2021 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

This document consists of **7** printed pages.

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.

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

Question	Answer	Marks	Partial Marks
1(a)	$\frac{20}{103}$ cao	**2**	**B1** for $\frac{10}{51.5}$
1(b)(i)	5 : 13 : 9	**1**	
1(b)(ii)	2.25 or $2\frac{1}{4}$	**1**	
1(b)(iii)	51.5	**B1**	
	$\frac{their\,51.5}{their\,2.25}$ *or* $\frac{their\,51.5}{135}$ [×60]	**M1**	
	22.89 or 22.889 or 22.88[8....]	**A1**	
1(b)(iv)	7.41 or 7.407(.....)	**3**	**M2** for $\frac{135-125}{135}\times100$ or $\left(1-\frac{125}{135}\right)\times100$ or $100-\left(\frac{125}{135}\times100\right)$ oe or **M1** for $\frac{135-125}{135}$ or $\left(1-\frac{125}{135}\right)$ or $\left(\frac{125}{135}\times100\right)$ oe
1(c)	128	**1**	
2(a)(i)	162 −486	**2**	**FT** *their* 162 × (−3) for second term **B1** for each
	Multiply by −3 oe	**1**	
2(a)(ii)	27 38	**2**	**FT** *their* 27 + 11 for second term **B1** for each
	Add next odd number oe	**1**	

Question	Answer	Marks	Partial Marks
2(b)(i)	−1 −3	**2**	**FT** *their* −1 minus 2 **B1** for each
2(b)(ii)	Each term is 2 less than the previous term oe	**1**	
2(b)(iii)	$-2n + 9$ oe final answer	**1**	
2(b)(iv)	21	**2**	**FT** *their* **(b)(iii)** **M1** for *their* **(b)(iii)** = −33
3(a)(i)	Hexagon	**1**	
3(a)(ii)	720	**2**	**B1** for (90 + 90 + 135 + 45 + 225 +135) oe or **M1** for (6 – 2) × 180 oe
3(b)(i)	Translation $\begin{pmatrix}-2\\-5\end{pmatrix}$	**2**	**B1** for each
3(b)(ii)	Reflection $y = 2$	**2**	**B1** for each
3(b)(iii)	Enlargement [Scale factor] 3 [Centre] (−6, −5)	**3**	**B1** for each
3(c)	Correct rotation (1, −2), (1, −3), (2, −4), (2, −5), (3, −4), (3, −2)	**2**	**B1** for correct size and orientation but wrong position, or for 5 correct points. If 0 scored **SC1** for polygon correctly rotated 90° clockwise.
4(a)(i)	10	**2**	**M1** for (8 + 9 + 6 + 4 + 15 + 17 + 11) ÷ 7
4(a)(ii)	Correct bar chart	**2**	**B1** for 5 or 6 correct height and all equal width and gaps or 7 correct height but not equal widths or gaps
	Correct vertical scale	**1**	
4(b)(i)	900 – (320 + 190) oe	**M1**	
4(b)(ii)	76 156	**2**	**B1** for each or **M1** for $\frac{190}{900}\times360$ or $\frac{390}{900}\times360$ or $\frac{190}{320}\times128$ or $\frac{390}{320}\times128$
4(b)(iii)	3 correct sectors	**2**	**FT** if *their* answers to part **(b)(ii)** total 232 **B1FT** for 1 correct sector.

Question	Answer	Marks	Partial Marks
5(a)	3 −1 −1 9	**3**	**B2** for 3 correct or **B1** for 2 correct
5(b)	Correct smooth curve	**4**	**B3FT** for 7 or 8 correct plots. or **B2FT** for 5 or 6 correct plots or **B1FT** for 3 or 4 correct plots
5(c)	(−0.5, −3.1 to −3.4)	**1**	
5(d)(i)	Correct line drawn	**1**	
5(d)(ii)	$x = -0.5$ oe	**1**	
6(a)	25	**2**	**B1** for $625 \div k$ or $k \div 25$ seen in working
6(b)	31	**1**	
6(c)	Any irrational number	**1**	
6(d)	$3 \times 3 \times 5 \times 7$ or $3^2 \times 5 \times 7$	**2**	**B1** for 3,3,5,7 or **M1** for correct factor tree/diagram/list/table
6(e)(i)	14	**2**	**B1** for an answer of 2 or 7 or 2×7 as final answer or **M1** for [28=] $2 \times 2 \times 7$ or $2^2 \times 7$ and [70=] $2 \times 5 \times 7$ or for complete correct list of factors for 28 and 70
6(e)(ii)	140	**2**	**B1** for $140k$ or $2 \times 2 \times 5 \times 7$ as final answer or **M1** for [28=] $2 \times 2 \times 7$ or $2^2 \times 7$ and [70=] $2 \times 5 \times 7$ or a list of multiples of 28 and 70 with at least 3 of each
6(f)(i)	$\frac{1}{64}$	**1**	
6(f)(ii)	0.016 cao	**2**	**B1** for [0].0156(25) If zero scored **SC1** for answer of [0].02
7(a)	$[b =]\frac{a+c}{5}$ final answer oe	**2**	**B1** for $a + c = 5b$ or $\frac{a}{5} = b - \frac{c}{5}$
7(b)	$-2x + 9$ final answer	**2**	**M1** for $4x + 12$ or $-6x - 3$ or $6x + 3$ or for $-2x$ or 9 in final answer
7(c)	$5x(2x - 3y)$ final answer	**2**	**B1** for $5(2x^2 - 3xy)$ or $x(10x - 15y)$ or 5x(2x – 3y) seen then spoilt

Question	Answer	Marks	Partial Marks
7(d)	6	**2**	**M1** for $5x - 3x = 8 + 4$ or better
7(e)	2 cao	**2**	**M1** for a correct Rise/Run or $(y_2 - y_1)/(x_2 - x_1)$ for 2 correct points on the line.
8(a)(i)	190	**2**	**B1** for 9.5 cm
8(a)(ii)	105	**1**	
8(b)	Quadrilateral *ABCD* correctly drawn with ruled lines *CD* and *DA*.	**3**	**B1** for 60° between *BC* and *CD*. **B1** for *CD* = 10.5
8(c)(i)	Arc, centre *C*, radius 4.5 cm from *CD* to *CB*.	**2**	**FT** *their* CD **B1** for *E* at 4.5 cm from *C*. or **M1** for an arc, centre *C*, radius *their CE*.
8(c)(ii)	4.71 or 4.712 to 4.713	**2**	**FT** *their CE* **M1** for 60 ÷ 360 × 2 × π × *their CE* oe
9(a)(i)	16	**3**	**M2** for $20^2 - 12^2$ or better or **M1** for $20^2 = 12^2 + BC^2$ or better
9(a)(ii)	53.1 or 53.13[0.....]	**2**	**M1** for cos[*CAB*=] $\frac{12}{20}$ oe
9(b)(i)	3456	**3**	**M2** for 0.5 × 12 × *their* **(a)(i)** × 36 oe or **M1** for 0.5 × 12 × *their* **(a)(i)** oe
9(b)(ii)	1920	**2**	**M1** for 20 × 36 or 12 × 36 or *their* **(a)(i)** × 36 or (2 ×) 0.5 × 12 × *their* **(a)(i)**
	cm^2	**1**	
9(b)(iii)	7.5	**2**	**B1** for 720 or 6 × *their***(a)(i)** correctly evaluated
9(c)	Correct ruled net	**3**	**B1** for each correct face correctly placed