Cambridge Assessment International Education

Cambridge IGCSE™

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/62**

Paper 6 (Extended) **May/June 2022**

MARK SCHEME

Maximum Mark: 60

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 2022 series for most Cambridge IGCSE, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

This document consists of **9** printed pages.

[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.

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.

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 marks, awarded for a valid method applied to the problem.

A Accuracy mark, awarded 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

awrt answers which round to
cao correct answer only
dep dependent
FT follow through after error
isw ignore subsequent working
nfww not from wrong working
oe or equivalent
rot rounded or truncated
SC Special Case
soi seen or implied

Opposite Corners

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Partial Marks</th></tr>
<tr><td rowspan="2">1</td><td>16 40
88 40
170 172 40</td><td>2</td><td>B1 for two from 16, 88, 170 and 172

B1 for 40 seen three times</td></tr>
<tr><td>One set of calculations for the opposite difference for the second or third grid</td><td>C1</td><td>86×68 – 66×their88
or
their170×152 – 150×their172</td></tr>
<tr><td>2(a)</td><td>42 46</td><td>1</td><td></td></tr>
<tr><td>2(b)</td><td>their42 × 6 = their252
2 × their46 = their92
their 252 – their 92</td><td>1</td><td></td></tr>
<tr><td rowspan="4">2(c)</td><td>8
48 160</td><td rowspan="3">2</td><td rowspan="3">B1 for four from 8, 48, 14, 50, 134, 138 and 178

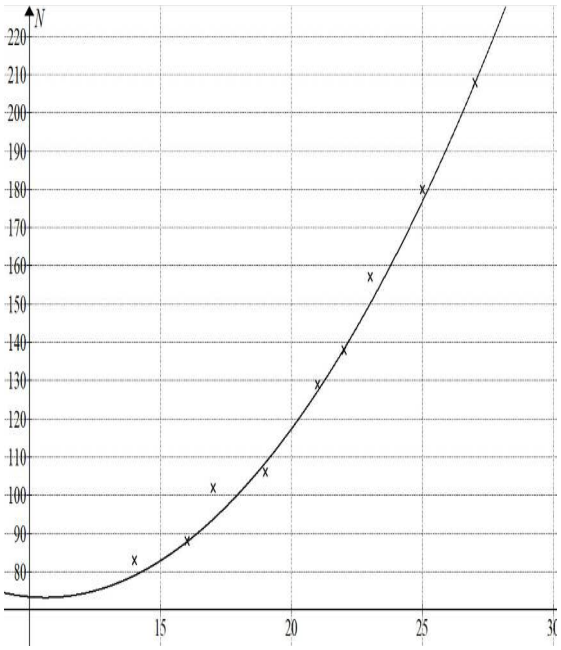
B1 for 160 seen three times</td></tr>
<tr><td>14
50 160</td></tr>
<tr><td>134 138
178 160</td></tr>
<tr><td>Complete set of calculations for a difference</td><td>C1</td><td>44 × their8 – 4 × their48
or their50 × their14 –10 × 54

or 174 × their138 – their134 × their178</td></tr>
<tr><td rowspan="2">3(a)</td><td>
<table>
<tr><th>Size of window</th><th colspan="2">Working</th><th>Difference</th></tr>
<tr><td>2 by 2</td><td>$(2-1)^2$</td><td>= 1</td><td>40</td></tr>
<tr><td>3 by 3</td><td>$(3-1)^2$</td><td>= 4</td><td>160</td></tr>
<tr><td>4 by 4</td><td>$(4-1)^2$</td><td>= 9</td><td>360</td></tr>
<tr><td>5 by 5</td><td>$(5-1)^2$</td><td>= 16</td><td>640</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>w by w</td><td>$(w-1)^2$ isw</td><td></td><td>$40(w-1)^2$ isw</td></tr>
</table>
</td><td>3</td><td>B1 for each row
or
B1 for the 3 cells in the working columns</td></tr>
<tr><td>A correct calculation for a 4 by 4 or 5 by 5 window</td><td>C1</td><td></td></tr>
</table>

Question	Answer	Marks	Partial Marks
3(b)	$40 \times (10 - 1)^2$ or 40×9^2 or correct calculation from grid	**C1**	**FT** substitution of 10 in *their* $40(w - 1)^2$
	3240	**1**	
4(a)	$n + 14$ $n + 16$	**2**	**B1** for each
4(b)	$(n + 14) \times (n + 2) = n^2 + 16n + 28$	**M1**	**FT** *their* $(n + 14)$ if binomial
	$n^2 + 16n + 28 - n^2 - 16n = 28$	**M1**	
5	n $n + 2$ $n + 2g$ $n + 2g + 2$ oe	**C2**	**C1** for each
	$(n + 2g)(n + 2) = n^2 + 2ng + 2n + 4g$	**C1**	**FT** *their* $(n + 2g)$ and *their* $(n + 2)$ if at least binomials include n and g
	[–] $n(n + 2g + 2)$ and $-n^2 - 2ng - 2n$ giving 4g final answer	**1**	
	5 Alternative method		
	2 4 $2 + 2g$ $2 + 2g + 2$ oe	**C2**	**C1** for correct expression in 2nd row
	$4(2 + 2g) = 8 + 8g$	**C1**	**FT** *their* even number in first cell and *their* expression in g
	$-2(4 + 2g) = -8 - 4g$ giving $4g$ as final answer	**1**	**FT** *their* even number in first cell leading to $4g$
6(a)	$n + 2x$ $n + 2gx$ oe $n + 2gx + 2x$ oe	**2**	**B1** for any two correct
	$(n + 2x)(n + 2gx) = n^2 + 2nx + 2ngx + 4gx^2$	**1**	**FT** *their* $(n + 2x)$ and *their*$(n + 2gx)$ if at least binomials include n, g and x.
	[–] $n(n + 2gx + 2x)$ and $-n^2 - 2ngx - 2nx$ leading to $4gx^2$	**1**	

Question	Answer	Marks	Partial Marks
6(b)	$gx^2 = 36$ or $g = \frac{36}{x^2}$ or $x = \frac{6}{\sqrt{g}}$ or for substituting for g or x in $4gx^2 = 144$	**C1**	
	2 by 2 window on a grid of width 36 3 by 3 window on a grid of width 9 4 by 4 window on a grid of width 4	**3**	**B2** for $x = 1$ and $g = 36$ and $x = 2$ and $g = 9$ and $x = 3$ and $g = 4$ soi or **B1** for one of the above soi
7(a)	[Temperature] 20.4[4…] [Number of chirps] 132[.33…]	**2**	**B1** for each
7(b)	4 points correctly plotted	**2**	**B1** for 3 points correctly plotted
7(c)	$N = 9.72T - 66.4$	**2**	**B1** for $9.72T - 66.4$ or $N = 9.72T - k$ or $N = k\,T - 66.4$ or $N = 9.7T - 66$
7(d)	Correct ruled straight line through *their* mean point	**2**	**B1** for ruled straight line through *their* mean point with positive gradient or **B1** for ruled straight line, not through *their* mean point, within tolerance.
7(e)	Line $N = 170$ drawn or substitution $N = 170$ in *their* model	**C1**	
	24 to 25	**1**	

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Partial Marks</th></tr>
<tr><td rowspan="2">7(f)(i)</td><td>One calculation to convert temperature
e.g. 1.8 × 19 + 32
and
correct calculation for finding N
e.g. $106 \times \frac{13}{60}$ oe</td><td>C2</td><td>C1 for a calculation to convert temperature e.g. 1.8 × 19 + 32
or
correct calculation for finding N
e.g. 106 oe</td></tr>
<tr><td><table><tr><th colspan="2">Temperature C to F</th></tr><tr><td>19</td><td>66</td></tr><tr><td>21</td><td>70</td></tr><tr><td>22</td><td>72</td></tr></table><table><tr><th colspan="2">Number of chirps</th></tr><tr><td>106</td><td>23</td></tr><tr><td>129</td><td>28</td></tr><tr><td>138</td><td>30</td></tr></table></td><td>2</td><td>B1 for three correct values</td></tr>
<tr><td>7(f)(ii)</td><td>Yes: The temperatures are around 40 more oe</td><td>1</td><td>Expect good fit oe as reason</td></tr>
</table>

Question	Answer	Marks	Partial Marks
8(a)	$88 = 0.5 \times 16^2 + 16a + b$	**C1**	
	$208 = 0.5 \times 27^2 + 27a + b$	**C1**	
	Correct isolation of variable(s) and correct subtraction or correct substitution and $11a = -116.5$ or $-11a = 116.5$ or $22a = -233$ or $-22a = 233$ OR Correct isolation of b in both equations and sketch of intersecting straight lines	**C2**	**FT** *their* equations if the same form. **C1** for one of the first two. OR **C1** for either
	$[a =] -11$ $[b =] 129$	**B1**	
8(b)	Correct sketch 	**2**	**B1** for correct shape **B1 dependent** for passing through (16, 88) and (27, 208) within tolerance
8(c)	Good fit oe	**1**	

Question	Answer	Marks	Partial Marks
9(a)(i)	[gradient or m] $\frac{3.5-2.35}{21-17.5}$ or $2.35 = 17.5m + c$ and $3.5 = 21m + c$ and 0.329 or 0.3285 to 0.3286 or 0.33 or $\frac{23}{70}$ or $\frac{1.15}{3.5}$ or $1.15 = 3.5m$ oe	**C2**	**C1** for [gradient or m] $\frac{3.5-2.35}{21-17.5}$ or $2.35 = 17.5m + c$ and $3.5 = 21m + c$
	(17.5, 2.35) or (21, 3.5) correctly substituted in $A =$ (*their* gradient)$T + c$	**C1**	**FT** *their* gradient
	$A = 0.329T - 3.4$	**B1**	
9(a)(ii)	$N = 19.7T - 204$ or $N = 60\ (0.329T - 3.4)$ oe isw	**1**	**FT** *their* model in **(a)(i)**
9(b)	Two correct statements from: African cricket has a smaller range of temperatures oe African cricket starts chirping at a higher temperature oe African cricket stops chirping at a higher temperature oe African cricket has a smaller range of chirps/second oe African cricket has greater number of chirps per minute oe African cricket has greater rate of increase of chirps oe The increase in the rate of increase of chirps of the Snowy Tree cricket is more than the increase in the rate of increase of chirps of the African cricket. oe African cricket number of chirps are more varied oe	**2**	**B1** for one statement