Cambridge Assessment International Education

Cambridge IGCSE™

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/52**

Paper 5 (Core) **May/June 2022**

MARK SCHEME

Maximum Mark: 36

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.

© UCLES 2022

[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.

© UCLES 2022

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

© UCLES 2022

Question	Answer	Marks	Partial Marks
1(a)	16 | 88 | 170 172 40 | 40 | 40	**3**	**B1** for 16 and 88 **B1** for 170 and 172 **B1** for 40 seen three times
	One set of calculations for an opposite difference for the second or third grid	**C1**	86 × 68 – 66 × *their* 88 or *their* 170 × 152 – 150 × *their* 172
1(b)	The same or It's 40 or It's always 40 oe	**1**	
2(a)	42 and 46	**1**	
2(b)	42 (× 6 =) 252 (2 ×) 46 (=) 92 252 – 92	**2**	For 2 marks **FT** *their* 42, *their* 46 **B1** for correct with one multiplication error (in 252 or 92) For **B1 FT** *their* 42 and 46 here
2(c)	8 | 14 | 134 138 48 | 50 | 178 160 | 160 | 160	**3**	**B2** for four from 8, 48, 14, 50, 134, 138 and 178 or **B1** for two from 8, 48, 14, 50, 134, 138 and 178 **If 0 scored SC1** for 160 seen 3 times
	One complete correct set of calculations for a difference	**C1**	**FT** 44 × *their* 8 – 4 × *their* 48 or *their* 50 × *their* 14 – 10 × 54 or 174 × *their* 138 – *their* 134 × *their* 178
3(a)	62 and 68	**2**	**B1** for each
3(b)	62 (× 8 =) 496 (2 ×) 68 (=) 136 496 – 136	**2**	For 2 marks **FT** *their* 62, *their* 68 **B1FT** for correct with one multiplication error (in 496 or 136)
3(c)	4 10 14 70 74 80 360 360	**2**	**B1** for three from 4, 10, 70, 14, 74, 80 **If 0 scored SC1** for 360 seen twice
	One complete correct set of calculations for a difference	**C1**	64 × *their* 10 – *their* 4 × *their* 70 or *their* 74 × 20 – *their* 14 × *their* 80

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Partial Marks</th></tr>
<tr><td>4(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 $(5-1)^2$ and 16
B1 for 640
or
B1 for $(w-1)^2$ seen once</td></tr>
<tr><td></td><td>Differences of 120, 200 and 280 seen
or two multiplications by 40
or 5 by 5 window from grid to support 640 seen</td><td>C1</td><td></td></tr>
<tr><td>4(b)</td><td>3240</td><td>1</td><td></td></tr>
<tr><td></td><td>Correct substitution of 10 in their $40(w-1)^2$

or complete correct calculation from grid</td><td>C2</td><td>C1 for 40×9^2 or
10 identified (without substitution) or incomplete correct calculation from grid</td></tr>
<tr><td>4(c)</td><td>$\left[\frac{1400}{40} =\right] 35$ and No oe with valid reason
e.g. 35 is not a square number or
$5^2 \times 40$ [=] 1000 <u>and</u> $6^2 \times 40$ [=] 1440 or
[40] $(6-1)^2$ [=] 1000 <u>and [40]</u> $(7-1)^2$ [=] 1440 (table form) or
correct calculations using correct grid numbers for 6 by 6 <u>and</u> 7 by 7 windows</td><td>2</td><td>B1 for 35 seen OR

either $5^2 \times 40$ [=] 1000 <u>or</u>
$6^2 \times 40$ [=] 1440 seen OR
either $(6-1)^2$ [=] 1000 <u>or</u>
$(7-1)^2$ [=] 1440 (table form)
OR
correct calculations using correct grid numbers for 6 by 6 <u>or</u> 7 by 7 window</td></tr>
<tr><td>5(a)</td><td>$n + 10$ and $n + 12$</td><td>2</td><td>B1 for each</td></tr>
<tr><td>5(b)</td><td>$(n + 10) \times (n + 2) = n^2 + 12n + 20$</td><td>M2</td><td>FT their $(n + 10)$

M1 for one error</td></tr>
<tr><td></td><td>$n^2 + 12n + 20 - n^2 - 12n$ leading to 20 or = 20</td><td>M1</td><td></td></tr>
<tr><td></td><td></td><td></td><td>If 0 scored SC1 for n = 2, 4, 6 or 8 explicitly stated and correctly substituted into all four correct expressions <u>and</u> complete correct calculations leading to 20</td></tr>
</table>

© UCLES 2022

Question	Answer	Marks	Partial Marks
6	4 [by 4]	**1**	
	A correct trial with a 4 by 4 window and full working OR Reference to difference for 2 by 2 being halved from 10 wide grid and testing with another sized window on 5 wide grid OR $20(w-1)^2 = 180$ $(w-1)^2 = 9$ $(w-1) = 3$	**C2**	**C1** for a correct trial with a 3 by 3 window or a 5 by 5 window with full working or incomplete trial with a 4 by 4 window OR Reference to difference for 2 by 2 being halved from 10 wide grid OR $20(w-1)^2 = 180$ soi by working