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CAMBRIDGE
International Education

Cambridge O Level

MATHEMATICS (SYLLABUS D) **4024/11**

Paper 1 **May/June 2024**

MARK SCHEME

Maximum Mark: 80

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 2024 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 **7** printed pages.

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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 descriptions 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.

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Mathematics-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, non-integer 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 or sign 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 A or B 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

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Question	Answer	Marks	Partial Marks
1(a)	A and T	**1**	
1(b)	N	**1**	
2	65	**2**	**M1** for [0].065 or for 4628 and 4693 seen or *their* mass in kg converted to grams at any stage
3(a)	[0].006 oe	**1**	
3(b)	6	**1**	
3(c)	32	**1**	
4(a)	Acceptable triangle with intersecting arcs	**2**	**B1** for acceptable vertex clearly indicated with no/incorrect arcs
4(b)	*Their* angle *BAC*	**1**	**FT** *their* angle *BAC* ± 2º
5(a)	8 inserted in the table	**1**	
5(b)	$\frac{9}{28}$	**1**	
6(a)	$5r + 10s$ or $5(r + 2s)$ Final answer	**2**	**B1** for $5r + ks$ *or* $10s + kr$ in answer or correct answer seen and spoiled
6(b)	$7x + 5y$ Final answer	**1**	
7	162	**3**	**B2** for [exterior] 72 or [interior] 108 seen or **M1** for $\frac{360}{5}$ or $\frac{5-2}{5}\times 180$
8	4120	**2**	**M1** for $4000 \times \frac{1.5}{100} \times 2$ oe
9(a)	12	**2**	**B1** for 6 km or 30 mins soi
9(b)	2.5 oe	**1**	
10(a)	64	**2**	**B1** for $\frac{5}{8}$ soi
10(b)	16.2	**1**	
11	8	**2**	**M1** for [Number of tins =] $\frac{36}{5}$ oe

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Question	Answer	Marks	Partial Marks
12	$\frac{7}{13}$	**3**	**M1** for $8x - 12 + 5x + 25$ [= 20] **M1FT** for collecting x terms or constants correctly **M1FT** for correctly solving *their* ($ax = b$) **Max 2 marks** if answer incorrect
13	180	**2**	**M1** for 240° = 120 oe or for 120 is 4 parts oe or for junior = 30 soi or $300x = 60(x + 120)$ oe
14	Correct method to eliminate one variable	**M1**	
	[x =] 4 and [y =] −⅓ oe nfww	**A2**	**A1** for either $x = 4$ or $y = -⅓$ oe nfww or after **A0 SC1** for a pair of values that satisfy either equation or for correct answers with no working
15	3, 400 and 2 seen as rounded values and final answer 15	**2**	**B1** for two of 3, 400 and 2 seen as rounded values
16(a)	Angle DAB = 122° because angles in opposite segments are supplementary	**2**	**B1** for angle **B1** for correct reason
16(b)(i)	144	**1**	
16(b)(ii)	40	**2**	**M1** for [angle OCD] = $\frac{180 - \textit{their}144}{2}$
17(a)	Correct cumulative frequency curve	**3**	**B2** for at least 3 points plotted correctly or **B1** for correct cumulative frequencies soi
17(b)(i)	Correct reading at CF 30	**1**	**FT** from their increasing curve
17(b)(ii)	Correct IQR from their graph	**2**	**FT** for 2 marks from their increasing curve or **B1FT** for correct reading of *their* LQ or *their* UQ
17(b)(iii)	60 – *their* reading at t = 80	**2**	**FT** for 2 marks from their increasing curve or **B1** for their reading at 80 from their increasing curve

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Question	Answer	Marks	Partial Marks
18	[a =] 147 and [b =] [±] 4	**3**	**M2** for $\frac{7^2 \times 12}{2^2}$ oe or $\sqrt{\frac{48 \times 2^2}{12}}$ oe OR **M1** for [k =] $\frac{12}{2^2}$ if $p = kq^2$ used **M1FT** for a = *their* $k \times 7^2$ or for $b = \sqrt{\frac{48}{their\ k}}$
19(a)	17	**1**	
19(b)	[$f^{-1}(x)$] = $\frac{x+5}{2}$ oe final answer	**2**	**B1** for $x = 2y - 5$ or $2x = y + 5$ or $\frac{y}{2} = x - \frac{5}{2}$
19(c)	[x =] 3 or −2	**3**	**M1** for $x^2 - x - 6$ [= 0] **M1FT** for correct method to solve *their* quadratic e.g. $(x + 2)(x - 3)$ oe
20	[N =] $\begin{pmatrix} 10 & 0 \\ 15 & -5 \end{pmatrix}$	**2**	**B1** for 3 correct elements or for $\begin{pmatrix} 20 & 0 \\ 30 & -10 \end{pmatrix}$
21	20	**4**	**M1** for area of A = 5000 ÷ 50 or 100 **M2** for $50 \times \sqrt{\frac{16}{their\,100}}$ or **M1** for $\sqrt{\frac{their\,100}{16}}$ or $\sqrt{\frac{16}{their\,100}}$ or $\left(\frac{50}{x}\right)^2 = \frac{their\,100}{16}$
22	$x = \frac{5b + 3a}{a - 2}$ oe final answer	**3**	**M1** for elimination of fraction **M1FT** for isolation of terms in x **M1FT** for factorising and completing to x = ... **Max 2 marks** if answer incorrect
23(a)	(4, 1)	**1**	
23(b)	[t=] 13	**2**	**M1** for $(-2-1)^2 + (5-3)^2$ oe

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Question	Answer	Marks	Partial Marks
23(c)	[y =] $\frac{3}{2}x + 8$ oe	**4**	**M1** for grad $AB = \frac{5-3}{-2-1}$ oe **M1FT** for grad of perpendicular $= -\frac{1}{their\ \frac{2}{-3}}$ **M1FT** for substituting (−2, 5) into $y = \left(their\ \frac{3}{2}\right)x + c$ or $y - 5 = \left(their\ \frac{3}{2}\right)(x - (-2))$
24(a)	**a** + **b** Final answer	**1**	
24(b)	− 2**a** – 2**b** + 2**d** or 2(**d – a – b**) Final answer	**1**	
24(c)	**a + b** Final answer	**2**	**M1** for correct vector route along the lines of the diagram or **d** - ½ *their CD* oe

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