Cambridge Assessment International Education

Cambridge O Level

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

Paper 1 **May/June 2021**

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.

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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 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.

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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, 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.

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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)	357	**1**	
1(b)	10	**1**	
2(a)	14	**1**	
2(b)	125	**1**	
2(c)	$\sqrt{8}$	**1**	
3(a)	$\frac{29}{35}$	**1**	
3(b)	$\frac{4}{11}$ cao	**1**	
4(a)	7	**1**	
4(b)	− 6.3	**1**	
5	[x =] 84	**2**	**M1** for 360 − 135 − 83 − *their* $C\hat{D}A$ or **B1** for $C\hat{D}A = 58^{\circ}$ soi
6(a)	$2^2 \times 7 \times 11$	**2**	**B1** for 2, 2, 7, 11 not as product or **M1** for any two stages correct in the factor tree or ladder method
6(b)	22	**1**	
7	10	**2**	**M1** for ½ (7 + 10) × h = 85 or better
8(a)	$4x + 23$ final answer	**1**	
8(b)	$x^2 - 10x + 25$ final answer	**2**	**M1** for $x^2 - 5x - 5x + 25$ or three of these terms correct
9(a)	>	**1**	
9(b)	=	**1**	
9(c)	>	**1**	

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Question	Answer	Marks	Partial Marks
10	400, 200 and 50 seen and final answer 4	**2**	**B1** for two of 400, 200, 50 seen
11(a)	0.97 or $\frac{97}{100}$	**1**	
11(b)(i)	78	**2**	**M1** for 52 ÷ [0.]2 oe or 52 × 1.5 oe
11(b)(ii)	260	**1**	
12	200	**2**	**M1** for $\frac{15}{[0].075}$ oe
13	(x =) 35 (y =) 77	**2**	**B1** for each or **M1** for attempt to solve the simultaneous equations $x + y = 112$ and $5y = 11x$ or for $\frac{112}{16}$ or 7
14(a)	29	**1**	
14(b)(i)	11	**1**	
14(b)(ii)	[+] 2 and − 2	**2**	**M1** for $\sqrt{}$ (− 1 + 5) oe
15(a)	12 56	**1**	
15(b)	75	**2**	**M1** for $\frac{15}{12}$ or $\frac{12}{60}$ oe used
15(c)	308 cao	**1**	
16(a)	Reflection and x = − 1 oe	**2**	**B1** for reflection **B1** for x = − 1 oe
16(b)	Rotation and 90º clockwise oe and (0,1)	**3**	**B1** for rotation **B1** for 90º clockwise oe **B1** for (0,1)
16(c)	Triangle D drawn in correct position with vertices (1,2) (5,2) and (5,4)	**2**	**B1** for triangle D drawn with correct orientation but in wrong position or for triangle D drawn with vertices (1,2) (−3,2) and (−3,0)
17	Angle A is common $A\hat{E}C = A\hat{D}B$ [= 90º] Given $AB = AC$ Given Triangle ADB is congruent to triangle AEC AAS	**3**	**B2** for two pairs of equal sides/angles with correct reasons or **B1** for one pair of equal sides/angles with correct reason or for two appropriate pairs with no or incorrect reasons

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Question	Answer	Marks	Partial Marks
18	Correct method to eliminate one variable	**M1**	
	[x =] 3, [y =] − ½ oe nfww	**A2**	**A1** for either [x =] 3 or [y] = − ½ oe nfww or after **A0** scored, **SC1** for correct answers with no working or for a pair of values that satisfy either equation
19	50	**2**	**B1** for $k = 2$ if $y = k(x-1)^2$ used or **M1** for $\frac{18}{(4-1)^2} = \frac{y}{(6-1)^2}$ oe or **M1 FT** for y = *their k* (6− 1)²
20(a)(i)	$y = 2$ ruled correctly	**1**	
20(a)(ii)	$y + x = 4$ ruled correctly	**1**	
20(b)	Correct region shaded	**2**	**B1** for region satisfying 3 of the inequalities
21(a)	$(3c + 2b)(x - 2y)$ final answer	**2**	**M1** for any correct partial factorisation
21(b)	$(6x - 5)(x + 2)$ final answer	**2**	**M1** for brackets which give two of the three correct terms or for $6x(x + 2) - 5(x + 2)$ or $x(6x - 5) + 2(6x - 5)$
22	3805	**2**	**M1** for 2350 or 1455 seen
23(a)(i)	8.3×10^2 cao	**3**	**M2** for answer figs 83 or **M1** for figs 166 seen or for $8\times10^2 + 3\times10^1$
23(a)(ii)	$b = [\pm]\sqrt{ad - c}$ final answer	**3**	**M1** for correct first step **M1 FT** for isolation of b^2 **M1 FT** for square root taken
23(b)	35 640	**2**	**M1** for $m = 3.6$ soi or for $\frac{36360}{10100}$
24(a)	$\begin{pmatrix} 1 & 3 \\ -1 & 3 \end{pmatrix}$	**1**	
24(b)	[c =] 3 and [d =] −1	**2**	**B1** for [c =] 3 **B1** for [d =] −1

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Question	Answer	Marks	Partial Marks
25	$4y + 3x = 29$ oe final answer	**4**	**M1** for [grad CP] = $\frac{5-1}{3-0}$ oe **M1FT** for [grad tangent] = $-\frac{3}{4}$ or -1 / *their* gradient CP **M1** for substitution of (3,5) into $y = mx + c$ oe