Cambridge Assessment International Education
Cambridge Ordinary Level

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

Paper 1 **May/June 2018**

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.

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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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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)	2	**1**	
1(b)	7	**1**	
2(a)	12	**1**	
2(b)	$\frac{11}{35}$ cao	**1**	
3	$\frac{9}{31}$ 0.3 0.32 $\frac{1}{3}$ $\frac{15}{40}$	**2**	**B1** for one number incorrect but rest correct or for correct order but reversed
4(a)	Diagram completed correctly 	**1**	
4(b)	Diagram completed correctly 	**1**	
5(a)	(0)730 oe	**2**	**B1** for 1030, 1420 or 9(h)50 seen or M1 for subtraction of 3(h) and 6(h) 50 seen
5(b)	60	**1**	
5(c)	9000	**1**	**FT** from (b) × 150
6(a)	$\frac{7}{16}$ oe	**1**	
6(b)	40	**1**	
6(c)	20	**1**	
7(a)	5 (items)	**1**	
7(b)	4 (items)	**1**	

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Question	Answer	Marks	Partial Marks
7(c)	3.85 or $3\frac{17}{20}$	**2**	**M1** for $\frac{\sum fx}{20}$ or $\frac{77}{20}$
7(d)	90	**1**	
8(a)	52	**1**	
8(b)	76	**2**	**B1** for 104 seen or $T\hat{A}B$ or $T\hat{B}A$ = 52 on diagram or in working
9	–1, 0, 1, 2	**2**	**M1** for $-4/3 < x$ or $x \leqslant 2$ or **B1** for 3 correct and none incorrect
10	Correct region shaded	**3**	**B1** for line parallel to AB 3 cm away for length of barn **B1** for 2 correct semicircles radius 3 cm centre A and B **B1** for region outside barn shaded between line parallel to AB and attempt at two arcs centred A and B
11	$a = 5$ and $b = 0$	**2**	**B1** for $a = 5$ or $b = 0$
12(a)	$\frac{9}{100}$ oe	**1**	
12(b)	60	**1**	
12(c)	75	**1**	
12(d)	(c) because based on a larger sample oe	**1**	
13(a)	4 points correctly plotted	**1**	
13(b)	positive	**1**	
13(c)	Ruled line of best fit drawn	**1**	
13(d)	4.35 – 4.55	**1**	Dependent on a line of best fit or FT *their* straight line of best fit with +ve gradient
14(a)	$(2x – y)(a + 3b)$ oe Final answer	**2**	**B1** for a correct partial factorisation
14(b)	$3(3x + y)(3x – y)$ Final answer	**2**	**M1** for $3(9x^2 – y^2)$ or $(9x + 3y)(3x – y)$ or $(9x – 3y)(3x + y)$
15(a)	−7	**1**	
15(b)	−33	**1**	
15(c)	$5 – 8x^3$ Final answer	**1**	

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Question	Answer	Marks	Partial Marks
16(a)	26	**1**	
16(b)	$\frac{3b}{4a}$ Final answer	**2**	**B1** for $\frac{3}{4}$ or $\frac{b^{[1]}}{a^{[1]}}$ seen or in final answer
17	106	**3**	**M1** for [BC² =] 6² + 7² or better and **M1** for [area triangle BCE =] $\frac{6\times 7}{2}$ or 21
18(a)	BC: constant speed 18 m/s for 50 s CD: deceleration 1.2 m/s² for 15 s	**3**	**B1** for BC correct and **B2** for CD completely correct or **B1** for CD with one error or omission If 0 marks scored then **SC1** for BC is constant speed and CD is deceleration
18(b)	1215	**2**	**M1** for ½ x 18 x(50 + 85) oe or one correct area : 180 or 900 or 135 or **SC1** for answer 1080
19(a)	28 800 000 oe	**1**	
19(b)(i)	1.3×10^8 put into the table	**1**	
19(b)(ii)	4.22×10^6 oe	**2**	**B1** for 33×10^5 or $[0].92 \times 10^6$ or figs 422
19(c)	Greenland	**1**	
20(a)	3	**1**	
20(b)	2.4	**1**	
20(c)	8100	**2**	**B1** for $\frac{27}{8}$ or $\frac{8}{27}$ soi or **M1** for $30 \times 60 \times 4.5$
21(a)	$\begin{pmatrix}13\\9\end{pmatrix}$	**1**	
21(b)	$n = -2$	**2**	**M1** for $\begin{pmatrix}3\\4\end{pmatrix} + n\begin{pmatrix}-4\\3\end{pmatrix} = \begin{pmatrix}11\\-2\end{pmatrix}$ or $3 + (-4n) = 1$ or $4 + 3n = -2$
22(a)	5	**1**	
22(b)	$t = s^3 - 4$	**2**	**B1** for s^3 soi in final answer
23(a)	F	**1**	
23(b)	A	**1**	
23(c)	E	**1**	

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Question	Answer	Marks	Partial Marks
24(a)	$\frac{12(x-1)+10(x+2)}{(x-1)(x+2)}=\frac{7}{2}$ or better	**M1**	
	$24x - 24 + 20x + 40 = 7x^2 + 7x - 14$	**M1**	
	Completion to $7x^2 - 37x - 30 = 0$ with no errors or omissions	**A1**	
24(b)	$6, -\frac{5}{7}$ from factorisation	**3**	**M2** for $[0 =]\ (7x + 5)(x - 6)$ or **M1** for factors that when expanded give two terms correct or for $(7x - 5)(x - 6)$ After 0 marks **SC1** for both answers correct using formula

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