Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

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

Paper 1 **October/November 2019**

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 October/November 2019 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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).

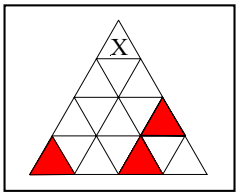
GENERIC MARKING PRINCIPLE 6:

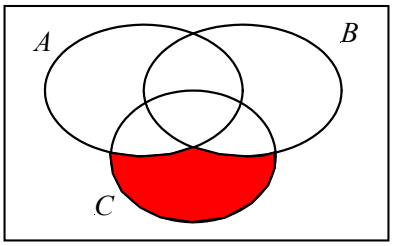
Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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)	$4\frac{5}{7}$ oe	**1**	
1(b)	[0.]39	**1**	
2	There is no correlation between the two sets of marks oe	**1**	
3(a)	[square-based] pyramid	**1**	
3(b)	5	**1**	
4(a)	$(1 - 6p)(1 + 6p)$ final answer	**1**	
4(b)	$(x + 3)(y + 4)$ final answer	**2**	**B1** for one correct partial factorisation seen
5(a)	01 25 or 1.25am	**1**	
5(b)	$\frac{3}{20}$ cao	**2**	**M1** for $\frac{8\times 3}{2\times 60+40}$ oe If 0 scored, then **SC1** for a final answer of $\frac{1}{10}$ from 24/240 seen or 3/160 or 17/20
6	0.03 $\frac{1}{30}$ 5% $\frac{2}{25}$ $\frac{1}{10}$	**2**	**B1** for four correct when one is covered up If 0 scored, **SC1** for answer $\frac{1}{10}$ $\frac{2}{25}$ 5% $\frac{1}{30}$ 0.03
7	$\frac{8}{t}$	**2**	**B1** for 'k' = $\frac{t}{4}$ oe if y = 'k'x used or **M1** for $2 \times 4 = xt$ oe or **M1FT** for $x = \frac{2}{\textit{their } k}$ oe when y = 'k'x used
8	60 and 20 and 0.9 seen, and final answer 200	**2**	**B1** for two of 60, 20, 0.9 seen

Question	Answer	Marks	Partial Marks
9	$x = 3$ and $y = -\frac{1}{2}$ oe nfww	**3**	**M1** for a correct method to eliminate one variable. **A1** for $x = 3$ **or** $y = -\frac{1}{2}$ oe, nfww After A0, **SC1** for a pair of values that satisfies either equation
10(a)	20	**2**	**M1** for $\frac{250 - 200}{250}$ [× 100] oe or for $\frac{200}{250}$ x 100 oe
10(b)	50	**1**	
11(a)	$13 - 15k$ final answer	**1**	
11(b)	0, and $\frac{3}{5}$ oe	**2**	**B1** for $x(5x - 3)$
12(a)	9	**1**	
12(b)	2	**1**	
12(c)	$4y^{\frac{3}{4}}$	**1**	
13(a)	2.3×10^{-4} cao	**1**	
13(b)	7.1×10^{9} cao	**2**	**B1** for answer figs 71 or for answer $A \times 10^{9}$ with $1 \leqslant A < 10$ or **M1** for 80×10^{8} or for 0.9×10^{9} or both numbers adjusted to other appropriate powers of 10
14(a)	30	**1**	
14(b)	$2^3 \times 3^2 \times 5^2 \times 7$	**1**	
14(c)	6	**1**	
15(a)		**1**	
15(b)(i)	46	**1**	
15(b)(ii)	32	**2**	**M1** for $360 - 3 \times 88$ oe or for $\frac{360}{3} - 88$ oe

Question	Answer	Marks	Partial Marks
16(a)		**1**	
16(b)(i)	f and j	**1**	
16(b)(ii)	8	**1**	
17(a)	G	**1**	
17(b)	$x + y > 8$ and $y > \frac{1}{2}x$ and $x > 0$	**2**	**B1** for two of $x + y > 8$, $y > \frac{1}{2}x$, $x > 0$ and up to 1 incorrect or for 3 correct and 1 incorrect
18(a)(i)	501	**1**	
18(a)(ii)	1.6	**2**	**B1** for [UQ =]502 or for [LQ =]500.4
18(b)	Median = 500.2 and IQR = 1.6	**2**	Strict **FT** for median = *their* **(a)(i)** – 0.8 and IQR = *their* **(a)(ii)** or **B1FT** for either
19(a)	9	**1**	
19(b)	$\frac{5}{x+1}$	**2**	**B1** for $xy = 5 - x$ or for $x = \frac{5-y}{y}$ or for $\frac{5}{x} = y + 1$ or better
20(a)	[p =] 60 [q =] 48	**2**	**B1** for one value correct or **B1FT** $q = 108 -$ *their* p
20(b)	140	**1**	
21(a)	106 cao	**1**	
21(b)	127 cao	**1**	
21(c)	53 cao	**1**	
21(d)	37	**1**	**FT** 90 – *their* **(c)**, *their* **(c)** < 90

Question	Answer	Marks	Partial Marks
22(a)(i)	Acceptable perpendicular bisector of AC , with correct construction arcs	**2**	**B1** for an acceptable perpendicular bisector of AC with no/incorrect construction arcs.
22(a)(ii)	Bisector of angle BAC	**1**	
22(b)	Correct measurement of their PQ	**1**	Strict FT Dep. on correct types of lines in **parts (a)(i)** and **(a)(ii)**
23(a)	$\frac{3}{5}$ oe	**1**	
23(b)	6	**1**	
23(c)	640	**2**	**M1** for $\frac{1}{2} \times 20 \times (24 + 40)$ oe
24(a)	$\begin{pmatrix} 8 & 1 \\ -7 & 0 \end{pmatrix}$	**2**	**B1** for two or three correct elements
24(b)	$\frac{1}{2}\begin{pmatrix} 0 & -1 \\ 2 & 3 \end{pmatrix}$ or $\begin{pmatrix} 0 & -\frac{1}{2} \\ 1 & \frac{3}{2} \end{pmatrix}$ oe isw	**2**	**B1** for $k\begin{pmatrix} 0 & -1 \\ 2 & 3 \end{pmatrix}$ oe with $k \neq \frac{1}{2}$ or for $\frac{1}{2}\begin{pmatrix} . & . \\ . & . \end{pmatrix}$ oe
24(c)	$\begin{pmatrix} 2 \\ -3 \end{pmatrix}$	**2**	**B1** for one correct element in a 2 by 1 matrix OR **M1** for $\mathbf{X} = \mathbf{A}^{-1}\begin{pmatrix} 3 \\ -4 \end{pmatrix}$ oe or for $\begin{pmatrix} 3x + y \\ -2x + 0y \end{pmatrix} = \begin{pmatrix} 3 \\ -4 \end{pmatrix}$ oe If 0 scored, then **SC1** for (2 – 3) as final answer

Question	Answer	Marks	Partial Marks
25(a)(i)	4**a**	**1**	
25(a)(ii)	2**b** – 4**a**	**1**	**FT** 2**b** – *their* **(a)(i)** in terms of **a** and/or **b** only
25(b)(i)	$\frac{3}{2}$**b**	**2**	**M1** for a correct vector route or for 3**a** + $\frac{3}{4}$ *their* **(a)(ii)** or for $\frac{3}{4} \times 2$**b** If 0 scored **SC1** for $-\frac{3}{2}$**b** as final answer
25(b)(ii)	3 : 2 oe	**1**	
25(b)(iii)	Trapezium	**1**	Dep. on a correct part **(b)(i)**, or *their* part **(b)(i)** being a multiple of **b**