Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

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

Paper 1 **May/June 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 May/June 2019 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

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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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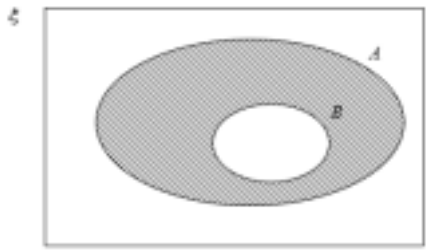
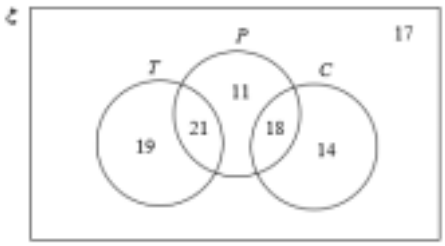
Abbreviations

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)	$\frac{38}{45}$	**1**	
1(b)	31	**1**	
2(a)	First grid completed with −7	**1**	
2(b)	Second grid completed with 0.08 and 2.41	**2**	**B1** for each.
3	$\sqrt[3]{63}$, 4 , $\sqrt{17}$, 4.5	**2**	**B1** for one number incorrect but rest correct
4(a)	9	**1**	
4(b)	$\frac{9}{16}$ oe isw	**1**	
5(a)	200	**1**	
5(b)	100	**1**	
6(a)(i)	6	**1**	
6(a)(ii)	$\frac{1}{25}$ or 0.04	**1**	
6(b)	7	**2**	**B1** for $8 = 2^3$ soi or 2^5 seen or $2^k = 128$
7(a)	32.55	**1**	
7(b)	16	**2**	**M1** for listing multiples of 4 to 40 or for listing multiples of 5 to 40 soi If zero scored, **SC1** for answer 18
8	Net completed correctly	**2**	**M1** for 2 or 3 faces completed correctly in correct positions
9(a)(i)	Apple 10 Banana 8 Orange 12	**1**	

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Question	Answer	Marks	Partial Marks
9(a)(ii)	Correct bar chart	**2**	**FT** *their* frequency table **B1** for bars labelled correctly and of equal width or bars drawn to correct height.
9(b)(i)	$\frac{7}{30}$ oe	**1**	
9(b)(ii)	48	**1**	
10(a)	$5(5x - 1)$ Final answer	**1**	
10(b)	$2(x + 3y)(x - 3y)$ Final answer	**2**	**B1** for $(2x + 6y)(x - 3y)$ or $(x + 3y)(2x - 6y)$ or $2(x^2 - 9y^2)$ or $2(x + 3y)(x - 3y)$ seen
11(a)	8.45×10^{-5} cao	**1**	
11(b)(i)	9.27×10^{12} cao	**1**	
11(b)(ii)	$3[.0] \times 10^{-2}$ cao	**2**	**B1** for [0].03 or 0.3×10^{-1} as answer
12(a)	11	**1**	
12(b)	16	**1**	
13(a)	69	**1**	
13(b)	21	**1**	**FT** 90 − *their* **(a)** $0 <$ *their* a < 90
13(c)	57	**1**	**FT** *their* **(a)** – 12 $0 <$ *their* a < 90
13(d)	147	**2**	**FT** 78 + *their* **(a)** or 90 +*their* **(c)** **B1** for angle $BAD = 33°$ or 90 – *their* **(c)** $0 <$ *their* a < 90 and $0 <$ *their* c < 90
14(a)(i)	Perpendicular bisector of AB with correct arcs	**2**	**B1** for acceptable bisector with no/incorrect arcs
14(a)(ii)	Bisector of angle ADC drawn with two pairs of correct arcs	**2**	**B1** for acceptable bisector with no/incorrect arcs
14(b)	Correct area shaded	**1**	**FT** *their* reasonable attempts at **(a)** and **(b)**
15	$\frac{1}{3}\begin{pmatrix} 5 & -7 \\ -1 & 2 \end{pmatrix}$ oe isw	**2**	**B1** for $\begin{pmatrix} 5 & -7 \\ -1 & 2 \end{pmatrix}$ soi or $[\lvert T \rvert =] 3$
16	$\sqrt{\frac{5c + 2a}{3}}$ oe final answer	**3**	**M1** for correct first step e.g. $5c = 3b^2 - 2a$ or better **M1 FT** *their* first step to $b^2 = \ldots$ **M1 FT** *their* formula to square root
17(a)	(1, 6)	**1**	

Question	Answer	Marks	Partial Marks
17(b)	$2y = x + 11$ oe	**4**	**M1** for $\frac{10-2}{-1-3}$ oe or gradient –2 **M1** for gradient of perpendicular = $\frac{1}{2}$ FT *their* gradient **M1** for attempt to find c in $y = mx + c$ using (1, 6) or FT *their* **(a)** and gradient
18(a)	[0].7, [0].3, [0].2, [0].4 correctly placed	**2**	**M1** for two or three correct
18(b)	[0].74 oe	**2**	**M1** for 0.7 × 0.8 or 0.3 × 0.6 oe
19(a)	Angle C is common Angle BDC = angle ABC (given) Hence similar	**2**	**B1** for the two correct pairings or one pair with reason
19(b)	7.5 oe	**2**	**M1** for $\frac{AB}{6} = \frac{10}{8}$ or $\frac{AB}{10} = \frac{6}{8}$ oe
20(a)	Correct region shaded 	**1**	
20(b)(i)	Correct Venn diagram. 	**2**	**M1** for 3, 4 or 5 subsets correct
20(b)(ii)	17	**1**	**FT** from *their* Venn diagram.
21(a)	Trapezium drawn with vertices (–3,–1) (–1,–1) (1,–3) (–3,–3)	**1**	

Question	Answer	Marks	Partial Marks
21(b)	Trapezium drawn with vertices (1,1) (1,2) (0,1) (–1,2)	**2**	**B1** for correct size and orientation, wrong centre or for correct enlargement scale factor $\frac{1}{2}$ centre (1, 0).
21(c)(i)	Reflection in the x-axis or $y = 0$	**2**	**B1** for either
21(c)(ii)	$\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$	**1**	
22	Correctly equating one set of coefficients	**M1**	or correct rearrangement of one of the equations
	Correct method to eliminate one variable	**M1**	or correct substitution into the other equation
	$[x =] 5$ $[y =] -2$	**A2**	**A1** for either $[x =] 5$ or $[y =] -2$ After **A0** scored, **SC1** correct answers with no working or a pair of values that satisfy either equation
23	$[x =] 1\frac{1}{2}$ or $[x =] -6$	**4**	**M1** for $2x^2 + 8x + x + 4$ [= 22] or better and **M2** for $(2x - 3)(x + 6)$ FT *their* three term quadratic or **M1** for $(2x + a)(x + b)$ where $ab =$ *their* -18 or $2b + a =$ *their* 9 FT *their* three term quadratic

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