



Cambridge O Level

MATHEMATICS

4024/01

Paper 1 Non-calculator

For examination from 2025

MARK SCHEME B

Maximum Mark: 100

Specimen

This document has **12** pages. Any blank pages are indicated.

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 descriptions for the question
- the specific skills defined in the mark scheme or in the generic level descriptions 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 descriptions.

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 descriptions in mind.

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 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.

MARK SCHEME NOTES

The following notes are intended to help with understanding of mark schemes in general, but individual mark schemes may include marks awarded for specific reasons outside the scope of these notes.

Anything in the mark scheme which is in square brackets [...] is not required for the mark to be earned, but if present it must be correct.

When a part of a question has two or more ‘method’ steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. The notation ‘dep’ is used to indicate that a particular M or B mark is dependent on an earlier mark in the scheme.

Types of mark

- M** Method mark, awarded for a valid method applied to the problem.
- A** Accuracy mark, given for a correct answer or intermediate step correctly obtained. For accuracy marks to be given, the associated Method mark must be earned or implied.
- B** Mark for a correct result or statement independent of Method marks.

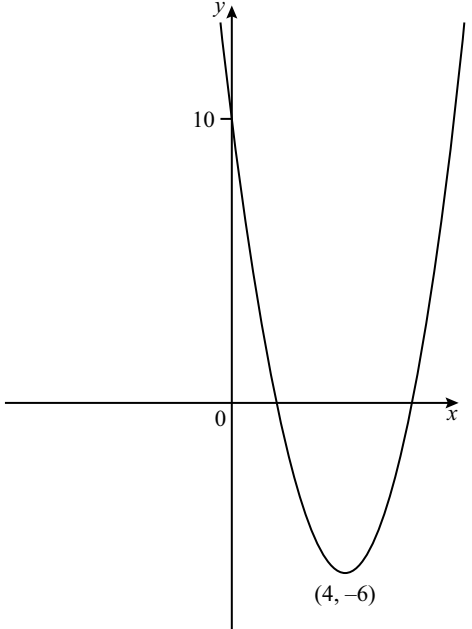
Abbreviations

awrt	answers which round to
cao	correct answer only
dep	dependent on the previous mark(s)
FT	follow through after error
isw	ignore subsequent working (after correct answer obtained)
nfw	not from wrong working
oe	or equivalent
SC	special case
soi	seen or implied

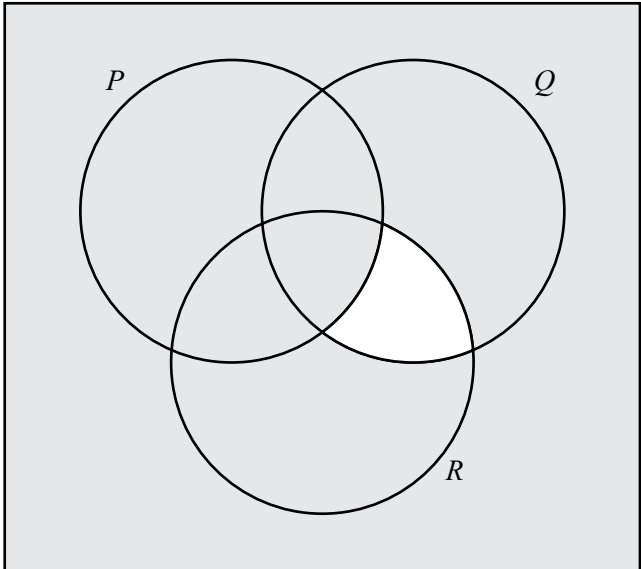
Question	Answer	Marks	Partial Marks
1(a)	1	1	
1(b)	2	1	
2(a)	-13	1	
2(b)	0.0015 oe	1	
3	3, 4, 7, 13, 13 in any order	3	B2 for five values with 3 out of 4 conditions satisfied or B1 for five values with 2 out of 4 conditions satisfied Conditions are: The median is 7 The mode is 13 The range is 10 They add up to 40
4(a)	100 AND Corresponding angles are equal	2	B1 for 100
4(b)	80 AND Co-interior angles sum to 180 or opposite angles of a parallelogram are equal and angles in a quadrilateral (parallelogram) add to 360	2	B1 for 80
4(c)	120	2	M1 for $y + 2y + z = 360$ soi
5(a)	0.6	1	
5(b)	5700	1	
6	0.143, $\frac{3}{20}$, 16%, $\frac{1}{6}$	2	Accept correct equivalents in correct order for 2 marks B1 for three values in correct order or M1 for all four values correctly converted to the same form to enable comparison
7(a)	$\frac{2}{8}$ oe	1	Accept fraction, percentage and decimal equivalents
7(b)	$\frac{5}{8}$ oe	1	Accept fraction, percentage and decimal equivalents

Question	Answer	Marks	Partial Marks
8	2:5:9 cao	2	M1 for 40:100:180 or better seen
9	8 [hours] 20 [minutes]	5	B4 for 500 [minutes] OR B2 for $\frac{19}{20}$ oe soi or M1 for $\frac{3}{4} + \frac{1}{5}$ oe M1 dep on previous M1 or B2 for $(1 - \text{their } \frac{19}{20}) \times \text{total time} = 25$
10(a)	$4n + 5$ oe final answer	2	B1 for $4n + p$ oe or $qn + 5$ oe $q \neq 0$ as final answer or $4n + 5$ oe seen
10(b)	21	2	M1 for <i>their</i> $(4k + 5) = 89$ or better
11(a)	Tree diagram completed correctly $\frac{4}{10}$ on first branch $\frac{4}{9}, \frac{6}{9}, \frac{3}{9}$ on second branches	2	B1 for $\frac{4}{10}$ correctly placed
11(b)	$\frac{12}{90}$ oe	2	FT <i>their</i> $\frac{4}{10} \times \text{their } \frac{3}{9}$ correctly evaluated dependent on proper fractions M1FT for <i>their</i> $\frac{4}{10} \times \text{their } \frac{3}{9}$, dependent on proper fractions, may be evaluated
12(a)	$6x^3 - 16x^2$ final answer	2	B1 for $6x^3$ or $-16x^2$
12(b)(i)	$(x + 19)(x - 19)$ final answer	1	
12(b)(ii)	6200	2	M1 for $(81 + 19) \times (81 - 19)$ or better If 0 scored, SC1 for 6561 or 361 seen

Question	Answer	Marks	Partial Marks
13	200 and 5 seen as rounded values and final answer 8	3	M2 for $\frac{200}{5^2}$ or B1 for 200 or 5 used as rounded values
14	20	3	M2 for $k \times \left(\frac{100-10}{100}\right) \times \left(\frac{100-50}{100}\right) = 9$ oe or M1 for $9 \div \left(\frac{100-10}{100}\right)$ oe or $9 \div \left(\frac{100-50}{100}\right)$ oe
15	$\frac{103}{330}$ cao	3	B2 for $\frac{309}{990}$ oe fraction or M1 for $[1000k - 10k =] 312.1212... - 3.12... $ oe or for $\frac{3}{10} + \frac{12}{990}$
16(a)(i)	Triangle drawn at (0, 3), (-2, 3), (-2, 6)	3	B2 for triangle correct size and orientation but wrong position or for correct plots but no triangle or M1 for $y = x + 2$ drawn
16(a)(ii)	Triangle drawn at (1,0), (1, 3), (5.5, 0)	2	B1 for triangle correct size and orientation but wrong position
16(b)	Rotation 90° clockwise oe centre (-2, 1)	3	B1 for each Award 0 marks if more than one transformation given
17(a)	$12 + 5\pi$ final answer	4	M1 for $k \times \pi \times 6^2 = 15\pi$, k may be $\frac{x}{360}$ M2 dep for <i>their</i> $k \times 2 \times \pi \times 6 + 2 \times 6$ oe where $k < 1$ or M1 dep for <i>their</i> $k \times 2 \times \pi \times 6$ oe where $k < 1$ (both dep on <i>their</i> k coming from a sector area calculation)
17(b)(i)	150π	1	

Question	Answer	Marks	Partial Marks
17(b)(ii)	$120 + 80\pi$	3	M2 dep for <i>their (a)</i> $\times 10 + 2 \times 15\pi$ oe (dep on <i>their (a)</i> in the form $a + b\pi$) or M1 for <i>their (a)</i> $\times 10$ or $2 \times 15\pi$ seen oe
18(a)	$(x - 4)^2 - 6$ final answer	2	M1 for $(x - 4)^2$
18(b)	Correct sketch  and (4, -6) indicated as turning point in 4th quadrant FT their (a) and 10 marked as y-intercept	3	B1 for positive U shape B1 for 10 marked as y-intercept B1FT for (4, -6) indicated as turning point FT their (a) Max 2 marks if sketch not correct
19	$-2(1 + \sqrt{5})$ or $-2 - 2\sqrt{5}$ final answer	3	B2 for $\frac{8(1 + \sqrt{5})}{1 - 5}$ or better or M1 for $\frac{8}{1 - \sqrt{5}} \times \frac{1 + \sqrt{5}}{1 + \sqrt{5}}$

Question	Answer	Marks	Partial Marks
20(a)(i)	$\frac{2x}{10} = \frac{x+5}{x+5+7.5}$ oe	M1	
	$2x(x+5+7.5) = 10(x+5)$ oe	M1	
	Step with brackets expanded leading to $2x^2 + 15x - 50 = 0$	A1	with no errors or omissions
20(a)(ii)	$(2x-5)(x+10)$	M2	M1 for $(2x+a)(x+b)$ where $ab = -50$ or $a+2b = 15$ or for $2x(x+10) - 5(x+10)$ or $x(2x-5) + 10(2x-5)$
	2.5 oe and -10	B1	
20(a)(iii)	15	1	FT <i>their</i> positive root + 12.5 correctly evaluated dependent on at least one positive root in (a)(ii)
20(b)	$\frac{3}{4}k$ oe	2	FT $\left(1 - \left(\frac{2 \times \text{their } 2.5}{10}\right)^2\right)k$ or for $\left(1 - \left(\frac{5 + \text{their } 2.5}{15}\right)^2\right)k$ M1 for $\left(\frac{1}{2}\right)^2 [k]$ oe or $2^2[k]$ oe FT <i>their</i> 2.5 and 15

Question	Answer	Marks	Partial Marks
21	\mathcal{E} 	1	
22	$-6x^3 + 7x^2 + 7x - 6$ final answer	3	B2 for correct expansion unsimplified or for simplified 4-term expression of correct form with 3 terms correct or B1 for one pair of brackets expanded with at least 3 terms out of 4 correct
23	$\frac{2d-3}{2+dy}$ oe final answer	4	M1 for $d(2-py) = 2p + 3$ or better M1 for isolating terms in p M1 for removing p as a common factor M1 for division by bracket to final answer Max M3 if answer incorrect
24(a)(i)	1	1	
24(a)(ii)	$9m^4$ final answer	3	B2 for answer $9m^k$ or km^4 or B1 for $27m^6$ shown
24(b)	$-\frac{5}{6}$	3	M2 for $5x + x + 3 = -2$ oe or M1 for 2^{5x} and 2^{-2}

Question	Answer	Marks	Partial Marks
25	$5\sqrt{7}$ cao	4	B3 for $\sqrt{175}$ or M2 for $5^2 + 5^2 + h^2 = 15^2$ or better or M1 for $5^2 + 5^2$ oe or $5^2 + h^2$ oe or $15^2 - h^2$ oe

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