

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2008 question paper

4024 MATHEMATICS

4024/01

Paper 1, maximum raw mark 80

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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

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Page 2	Mark Scheme	Syllabus	Paper
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1	(a) $\frac{1}{14}$	1	In both parts, if answers decimal, accept fractions in working	
	(b) $4\frac{2k}{3k}$	1 2	After $0 + 0$, answers 0.0714(0) to 0.07145 and {4.665 to 4.67(0) or $\frac{14k}{3k}$ }	C1
2	(a) 6.7 oe	1		
	(b) (0).051 oe	1 2		
3	(a) -8	1		
	(b) $\frac{x-2}{5}$ oe	1 2	Must use x	
4	100 or 120	2 2	Answer with more sig figs which rounds to this or figs 1 or 12 or at least 2 of 9, 2^2 and 0.3 seen	C1 M1
5	(a) 160.27	1	Accept 160 or 160.3	
	(b) 6820	1 2		
6	26 (cm)	2 2	$\frac{10}{\sin \theta}$ or $\frac{10 \times 13}{5}$ or $\sqrt{\{10^2 + 24^2\}}$ seen Accept $\frac{10(\sin 90)}{\sin \frac{5}{13}}$ for M1	M1
[12]				[12]
7	(a) $32x + 120 \text{ (cm}^2\text{)}$ oe	M1	Accept any equivalent seen anywhere	
	(b) 8 (cm)	2 3	Their (a) = 376 oe seen [Their (a) must be linear in x]	M1

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8	(a) 1	1		
	(b) $\frac{1}{81}$	1	Accept (0).0123(0) to (0).01235	
	(c) 27	1 3	Accept ± 27	
9	(a) ($BDC =$) 42°	1	Accept all answers on the diagram if not seen in answer or working space	
	(b) ($ABC =$) 90°	1		
	(c) ($ACB =$) 48° or 138 – their (b) $\sqrt[3]{\text{ft}}$	1 3	$\sqrt[3]{\text{ft}}$ only allowed if $0^\circ < ACB \leq 96^\circ$	
10	(a) $y = 4x^2$ or $y = kx^2$ with $k = 4$ seen anywhere	2	$4x^2$ seen or $y = kx^2$ seen	M1 M1
	(b) $\frac{3}{2}$ and $-\frac{3}{2}$ oe www cao	1 3	Both required	
		[12]		[12]
11	(a) Equilateral triangle	1	Accept either word alone	
	(b) Rectangle	1		
	(c) Kite	1 3		
12	$x = 2$ and $y = -3$	3 3	One correct with supporting working or correct method to eliminate one variable condoning one arithmetic slip [reaching such as $11x = k$, $kx = 22$, $11y = k$ or $ky = (-)33$]	C2 M1
13	(a) 3.75 or $3\frac{3}{4}$ or $\frac{30}{8}$ (m/s ²) oe	1	Accept -3.75 etc.	
	(b) 270 (m)	2 3	Correct method to find complete area under graph	M1
		[9]		[9]

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14 (a) 259 (g)	1		
(b) 20 (%)	2 3	120, $16\frac{2}{3}$ or 16.6 to 16.7 oe or fig ($\frac{5}{25}(\times 100)$)	C1 M1
15 Final answer $\frac{8-t}{(2t-1)(t+2)}$ oe	3 3	$8-t$ and $(2t-1)(t+2)$ or $2t^2+3t-2$ seen in single fraction, not necessarily together or $3(t+2)-2(2t-1)$ seen in single fraction with quadratic denominator [condoning missing brackets]	M2 M1
16 (a) Ruled line from (0, -2) to (2, -1) drawn	1	Allow tolerance of $\frac{1}{2}$ small square	
(b) Correct region shaded and labelled R Allow $\sqrt{}$ if line wrong if possible	2 $\sqrt{}$ 3	Accept shaded in or out if R correct or Shaded in or out, without R Allow C1 $\sqrt{}$ if line wrong if possible If no line, shading with R marked to right of C1 $x=0$, below $2y=4-3x$, not bounded by $y=0$	C1
		[9]	[9]
17 (a) (3, -6)	1		
(b) -4	1	Accept equivalents, such as $\frac{-16}{4}$ or $\frac{16}{-4}$	
(c) $y=-4x+6$ or 3 term equivalent Accept $y=-4x+c$ with $c=6$ seen	2 4	3 term line of gradient their (b) or which passes through (1, 2) or (5, -14) $-4x+6$ alone	C1 C1
18 (a) 9.19×10^7 (km)	2	Accept 9(or 9.2) $\times 10^7$ Correct answer not in standard form or 150 000 000 – 58 100 000 or $15 \times 10^7 - 5.81 \times 10^7$ seen	C1 M1
(b) (0).15, $\frac{15}{100}$ or $\frac{3}{20}$ (terametres)	2 4	$1.5 \times 10^8 \times 10^3 / 10^{12}$ seen 1.5×10^{-4} oe seen	M1 S C1

Page 5	Mark Scheme	Syllabus	Paper
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19 (a) (i) $5x(3x + 2)$	1	$\left\{ \begin{array}{l} \text{In both parts, ignore extra brackets,} \\ \text{condone missing outside brackets} \end{array} \right\}$ $\left\{ \begin{array}{l} \text{If only solutions, accept factors in working} \end{array} \right\}$	
(ii) $(t + 3)(t - 5)$	1		
(b) $(0).6$ oe	2 4	$4x - 1.2 = 3x - 0.6$ oe, or better seen	M1
20 (a) $\begin{pmatrix} 1 & 3 \\ 2 & 1 \end{pmatrix}$	2	At least 2 correct elements	C1
(b) $\frac{1}{5} \begin{pmatrix} 4 & -1 \\ -3 & 2 \end{pmatrix}$ oe	2 4	$\frac{1}{5}$ soi or $\begin{pmatrix} 4 & -1 \\ -3 & 2 \end{pmatrix}$ soi	C1
		[16]	[16]
21 (a) $(t) < -1.5, -1\frac{1}{2}$ or $-\frac{3}{2}$ oe (e.g. $-\frac{6}{4}$)	2	$t > -1.5$ or -1.5 alone	C1
		or $-6 > 4t$ oe or better seen	M1
(b) 58	2 4	At least two of +4, +36 and +18 seen	M1
22 (a) -39	1		
(b) (i) $3n + 1$ or any equivalent	1		
(ii) (a) $\frac{19}{36}$	1		
(b) $\frac{3n+1}{n^2}$ or $\frac{\text{their (b)(i)}}{n^2}$	1 4		

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23 (a) (i) (1 :) 300 000	1		
(ii) 30 (km)	1	Accept answers in range 29.5 to 30.5	
(b) Correct triangle drawn with sides 7 (± 0.2) and 6 (± 0.2) cm, arcs visible	2	No arcs seen, sides in wrong order and/or sides ± 0.4 cm and/or AC , BC not joined	C1
		If C on wrong side of AB , otherwise correct	C1
(c) Perpendicular bisector of AB drawn	1	Within 0.2 cm of centre of AB and within 2° of perp Minimum length 5 cm	
(d) F and G marked correctly $\sqrt{f}$	1 $\sqrt{f}$ 6	Each to be 3 (± 0.2) cm from C on attempt at perp bisector, even if C is below AB	
	[14]		[14]

24 (a) (i) 2	1		
(ii) $2.52, 2\frac{13}{25}$ or $2\frac{26}{50}$ www	3	2.52 oe or 2.5 seen www or such as $\frac{126}{50}$ seen or $\frac{(0 \times 10) + 1 \times 11 + 2 \times 8 + 3 \times 3 + \dots}{10 + 11 + 8 + 3 + \dots}$ (condoning one error)	M2 M1
(iii) $\frac{3k}{175k}$ oe	2	$\frac{7}{50} \times \frac{6}{49}$ or $\frac{7}{50} \times \frac{6}{50}$ or better seen	M1
(b) Ignore any block diagrams and outside the range $5 \leq t \leq 11$ Plots at heights 21, 11, 13 and 5 joined with straight lines	1	(Accept $10\frac{1}{2}$, $5\frac{1}{2}$, $6\frac{1}{2}$ and $2\frac{1}{2}$)	
Time axis scaled and plots at 5, 7, 9 and 11	1 8	independent	
	[8]		[8]