

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**

GCE O Level

**MARK SCHEME for the November 2005 question paper**

**4024 MATHEMATICS**

**4024/01**

**Paper 1 maximum raw mark 80**

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

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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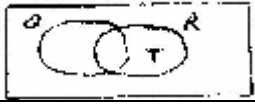
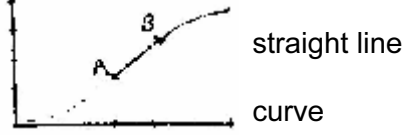
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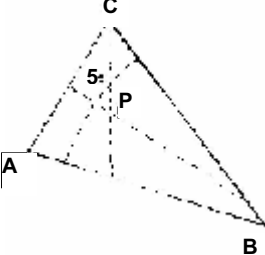
Page 1	Mark Scheme	Syllabus	Paper
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1	(a) 2.44 (b) (0).021		1 1	
2	(a) $\frac{9}{20}$ (b) $\frac{2}{15}$ c.a.o.		1 1	
3	(a) $\frac{3}{8}$ or $\frac{6}{16}$ only (b) 30		1 1	
4	(a) M, S, L (b) 20		1 1	
5	(a) $\frac{1}{4}$ c.a.o. (b) $2.4 \times 10^6$ c.a.o.		1 1	
6	(a) 190 (b) $\frac{1}{2}(n+1)(n+2)$ o.e. (seen)		1 1* [12]	Accept $(n+1+1)$
7	$\frac{90000}{50 \times 60}$ 30	M1 A1	2*	
8	(a) 73 (b) 31 f.t. their 73 – 42 (c) 318		1 f.t. 1 1	
9	(a) Fig. 6 (b) Fig. 4 (c) Fig. 2		1 1 1	
10	(a) 75 (b) $\frac{360}{180-165}$ or $(2n-4)90 = 165n$ 24	M1 A1	1 1 2* [11]	o.e.
11	(a) $5x(x-2)$ (b) 4 (c) 0 or -2		1 1 1	
12	(a) $A\hat{C}B = C\hat{D}A$ and $B\hat{A}C = A\hat{C}D$ $\Rightarrow \Delta$ s similar (b) $\frac{7}{AD} = \frac{4}{6}$ or $\frac{6}{9}$ $10\frac{1}{2}$	M1 A1	1 1 2*	Any irrelevant or wrong information = 0

Page 2	Mark Scheme	Syllabus	Paper
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13	(a)		1	Any clear indication of a set in $R \cap Q'$	
	(b)	(i) Squares (ii) 	1 1		
14	(a)	$y \geq \frac{1}{2}x$ o.e.	1	Accept as separate statements	
	(b)	$-4\frac{1}{2} \leq x < -2$ -4 and -3	M1 A1 2* [12]		
15	(a)	$\begin{pmatrix} 0 & 1 \\ -1 & 2 \\ 0 & -3 \end{pmatrix}$	2	SC1 for 4 or 5 elements correct	
	(b)	(1 -1)	2	SC1 for a (1 x 2) matrix	
16	(a)	-17	1	Allow y etc.	
	(b)	5	1		
	(c)	$\frac{1}{3}(x+5)$	1		
	(d)	3 f.t.	f.t. 1		
17	(a)	Idea of $100 \pm 2.5$ or $75 \pm 2.5$	M1	i.e. any one of 97.5, 102.5, 72.5 or 77.5 seen	
	(b)	340	A1		2*
		$\frac{22.5 \text{ or } 21.5}{2.5 \text{ or } 3.5}$	M1		
	9	A1	2*		
18	(a)	$x = 0$ $y = -2$	1 1	[16]	
	(b)	(i) 13200	1		
		(ii) 500	1		
19	(a)	219 → 221 incl.	1		
	(b)	13	1		
	(c)	All 8 points plotted correctly Smooth curve	P1 C1		2
	(d)	A – any comparison using curves			1
20	(a)	13 – 14	1	A B from (30,300) to (40, their 500 f.t.) from (40, their 500 f.t.) to (60, their 700)	
	(b)	$\frac{2}{3}$ or 0.66 – 0.67	1		
	(c)	(i) 500	1		
		(ii) 700 f.t. their 500 + 200	f.t. 1		
	(d)	 straight line curve	L1 C1 2 [11]		

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21	(a)	(4, 4)	B1 + B1	1	Mark at earliest $ax + by + c = 0$ stage	
	(b)	$(2\frac{1}{2}, 2)$		1		
	(c)	$y = 4$		1		
	(d)	$y = \frac{1}{2}x - \frac{1}{2}$		2*		
	(e)	20		1		
22	(a)	(6, 2)		1	SC1 for 2 points plotted correctly or 3 points stated	
	(b)	(i)		$(-2, 0)$		1
		(ii)		$90^\circ$ AC		1
	(c)	$(0, -2), (-4, -2), (-6, -6)$		2		
	(d)	$\begin{pmatrix} -\frac{1}{2} & 0 \\ 0 & -\frac{1}{2} \end{pmatrix}$		1		
				[12]		
23	(a)	(i)	1:2 000 000	1	I within $2^\circ$ II within $2^\circ$ 2 mm III within 2 mm	
		(ii)	235 – 237	1		
	(b)	 <p>Constructions</p> <p>I L bisect C1 II I bisect M1 III arc B1</p> <p>The possible positions clearly indicated P1</p>	4			
				[6]		