www.mymathscloud.com

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS GCE Ordinary Level

MARK SCHEME for the October/November 2008 question paper

4024 MATHEMATICS

4024/01

Paper 1, maximum raw mark 80

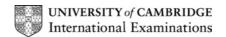
This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began.

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.

• CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the October/November 2008 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.



Page 2 Mark Scheme Syllabus Papuratus GCE O LEVEL – October/November 2008 4024 01

1 e.g. $\frac{9}{500}$, 1.8 x 10⁻²

(b) 1.9 or equiv. 1 e.g. $\frac{19}{10}$ 2 (a) $\frac{9}{20}$ cao 1 (b) 32.5 1 Accept 32 + equiv. fraction, but not $\frac{65}{2}$, or worse 3 (a) $\frac{8}{15}$ or equiv. 1 Accept 0.53 or better (0.533) 4 6 000 000 Any (long) multn., of 2 numbers with 2 or more digits, used to get final ans. gets 0. 2 * or sc1 for 6 000 (00) in Ans. space or B1 for 10 000, 30 and 20 seen 5 (a) 7 cao 1 (b) 8 cao 1 6 (a) 25 1 (b) 2 1 Not 200 cm 7 (a) 7 × 10 ² 1 Not 200 cm				1	0 10 2
2 (a) $\frac{9}{20}$ cao 1	1	(a)	0.018 or equiv.	1	e.g. $\frac{9}{500}$, 1.8 x 10^{-2}
(b) 32.5 1 Accept 32 + equiv. fraction, but not $\frac{8}{2}$, or worse 32.5 1 Accept 32 + equiv. fraction, but not $\frac{8}{2}$, or worse 32.5 32.5 1 Accept 0.53 or better (0.533) 32.5 32.5 1 Accept 0.53 or better (0.533) 32.5 Accept 0.53 or better (0.5333) 32.5 Accept		(b)	1.9 or equiv.	1	e.g. $\frac{19}{10}$
but not $\frac{65}{2}$, or worse constant $\frac{8}{2}$; or worse but not $\frac{65}{2}$, or worse constant $\frac{8}{2}$, or worse constant $\frac{6}{2}$, or worse	2	(a)	$\frac{9}{20}$ cao	1	
3 (a) $\frac{8}{13}$ or equiv. 1 Accept 0.53 or better (0.533) 4 6 000 000 Any (long) multin., of 2 numbers with 2 or more digits, used to get final ans. gets 0. 2 * or sc1 for 6 000 (00) in Ans. space or B1 for 10 000, 30 and 20 seen 5 (a) 7 cao 1 (b) 8 cao 1 7 (a) $\frac{7 \times 10^2}{10^2}$ 1 Not 200 cm 1 7 (a) $\frac{7 \times 10^2}{10^2}$ 1 8 (a) (i) 0.25 o.e. 1 (ii) 0.65 o.e. f.t. their (a) + 0.4 provided $0 < ans < 1$ 1 $\frac{1}{}$ e.g. $\frac{13}{20}$ (b) 40 1 9 (a) (a) $T = \frac{36}{L^2}$, or $\left(\frac{6}{L}\right)^2$ 2 (b) $\frac{6}{5}$ o.e. 1 10 or sc1 for $\frac{constant}{L^2}$		(b)	32.5	1	
(b) 8 cao 1 2 * or sc1 for 6 000 (00) in Ans. space or B1 for 10 000, 30 and 20 seen 5 (a) 7 cao 1 (b) 8 cao 1 6 (a) 25 1 (b) 2 1 Not 200 cm 7 (a) 7×10^2 1 (b) 9.21×10^8 2 * or B1 for correct evaluation of n^2 seen, in any form. e.g. 900 000 000, 9×10^8 , 90×10^7 8 (a) (i) 0.25 o.e. 1 e.g. $\frac{1}{4}$ (ii) 0.65 o.e. f.t. their (a) + 0.4 provided $0 < ans < 1$ 1 e.g. $\frac{13}{20}$ 9 (a) 0.65 o.e. f.t. their (a) + 0.4 provided $0 < ans < 1$ 1 e.g. $\frac{13}{20}$ 10 (a) $T = \frac{36}{L^2}$, or $\left(\frac{6}{L}\right)^2$ 2 or sc1 for $\frac{constant}{L^2}$ 10 (b) 0.5					but not $\frac{65}{2}$, or worse
4 6 000 000 Any (long) multra, of 2 numbers with 2 or more digits, used to get final ans. gets 0. 2 * or sc1 for 6 000 (00) in Ans. space or B1 for 10 000, 30 and 20 seen 5 (a) 7 cao	3	(a)	$\frac{8}{15}$ or equiv.	1	Accept 0.53 or better (0.533)
Any (long) multin, of 2 numbers with 2 or more digits, used to get final ans. gets 0. 5 (a) 7 cao (b) 8 cao 1 (b) 2 1 Not 200 cm 7 (a) 7×10^2 (b) 9.21×10^8 7 (a) 7×10^2 (b) 9.21×10^8 8 (a) (i) 0.25 o.e. (ii) 0.65 o.e. f.t. their (a) $+ 0.4$ provided $0 < ans < 1$ (b) 40 9 (a) (b) 40 1 1 (b) 40 1 1 (c) 40 1 1 (d) $1 = \frac{36}{L^2}$, or $\left(\frac{6}{L}\right)^2$ (e) $\frac{1}{2}$ (f) $\frac{1}{5}$ o.e. 1 $\frac{1}{2}$ (f) $\frac{1}{5}$ (g) $\frac{1}{5}$ (h) $\frac{1}{5}$		(b)	8 cao	1	
digits, used to get final ans. gets 0.	4		6 000 000	2 *	
(b) 8 cao 1 (b) 2 1 Not 200 cm 7 (a) 7×10^2 1 (b) 9.21×10^8 2* or B1 for correct evaluation of n^2 seen, in any form. e.g. $900\ 000\ 000$, 9×10^8 , 90×10^7 8 (a) (i) 0.25 o.e. 1.t. their (a) $+0.4$ provided $0 < ans < 1$ 1 (b) 40 1 9 (a) 1 (b) 40 1 1 (b) 40 1 1 (c) 40 2 2* or B1 for $n(B \cap S) = 10$ soi 10 (a) $T = \frac{36}{L^2}$, or $\left(\frac{6}{L}\right)^2$ 2 or sc1 for $\frac{constant}{L^2}$ 1 (b) $(\pm)\frac{6}{5}$ o.e. 1					or B1 for 10 000, 30 and 20 seen
6 (a) 25 1 Not 200 cm 7 (a) 7×10^2 1 Not 200 cm (b) 9.21×10^8 2 * or B1 for correct evaluation of n^2 seen, in any form. e.g. $900\ 000\ 000$, 9×10^8 , 90×10^7 8 (a) (i) $0.25\ o.e.$ 1 e.g. $\frac{1}{4}$ (ii) $0.65\ o.e.$ f.t. their (a) + 0.4 provided $0 < ans < 1$ 1 $\sqrt{ e.g. \frac{13}{20}}$ (b) 40 1 9 (a) (b) 9 2 * or B1 for $n(B \cap S) = 10$ soi 10 (a) $T = \frac{36}{L^2}$, or $(\frac{6}{L})^2$ 2 or sc1 for $\frac{constant}{L^2}$ (b) $(\pm)\frac{6}{5}$ o.e. 1	5	(a)	7 cao	1	
6 (a) 25 1 Not 200 cm 7 (a) 7×10^2 1 Not 200 cm (b) 9.21×10^8 2 * or B1 for correct evaluation of n^2 seen, in any form. e.g. $900\ 000\ 000$, 9×10^8 , 90×10^7 8 (a) (i) $0.25\ o.e.$ 1 e.g. $\frac{1}{4}$ (ii) $0.65\ o.e.$ f.t. their (a) + 0.4 provided $0 < ans < 1$ 1 $\sqrt{ e.g. \frac{13}{20}}$ (b) 40 1 9 (a) (b) 9 2 * or B1 for $n(B \cap S) = 10$ soi 10 (a) $T = \frac{36}{L^2}$, or $(\frac{6}{L})^2$ 2 or sc1 for $\frac{constant}{L^2}$ (b) $(\pm)\frac{6}{5}$ o.e. 1		(b)	8 cao	1	
(b) 2 1 Not 200 cm 7 (a) 7×10^2 1 (b) 9.21×10^8 2 * or B1 for correct evaluation of n^2 seen, in any form, e.g. $900\ 000\ 000$, 9×10^8 , 90×10^7 8 (a) (i) 0.25 o.e. 1 e.g. $\frac{1}{4}$ (ii) 0.65 o.e. f.t. their (a) + 0.4 provided $0 < ans < 1$ 1 e.g. $\frac{12}{20}$ (b) 40 1 9 (a) 1 2 * or B1 for $n(B \cap S) = 10$ soi 10 (a) $T = \frac{36}{L^2}$, or $\left(\frac{6}{L}\right)^2$ 2 or sc1 for $\frac{constant}{L^2}$ (b) $(\pm)\frac{6}{5}$ o.e. 1 or sc1 for $\frac{constant}{L^2}$	6				
7 (a) 7×10^2					N . 200
(b) 9.21×10^{8}	7	· /			Not 200 cm
any form. e.g. $900\ 000\ 000,$ $9 \times 10^{8}, 90 \times 10^{7}$ 8 (a) (i) 0.25 o.e. (ii) 0.65 o.e. f.t. their (a) $+0.4$ provided $0 < ans < 1$ (b) 40 1 (b) 40 1 2 * or B1 for $n(B \cap S) = 10$ soi 10 (a) $T = \frac{36}{L^{2}}$, or $\left(\frac{6}{L}\right)^{2}$ 2 or sc1 for $\frac{constant}{L^{2}}$ (b) $(\pm)\frac{6}{5}$ o.e.	'	(a)	/ * 10	1	
(ii) 0.65 o.e. f.t. their (a) + 0.4 provided $0 < ans < 1$ (b) 40 1 (b) 40 1 2 * or B1 for $n(B \cap S) = 10$ soi 10 (a) $T = \frac{36}{L^2}$, or $\left(\frac{6}{L}\right)^2$ (b) $(\pm)\frac{6}{5}$ o.e.		(b)	9.21×10^{8}	2 *	or B1 for correct evaluation of n^2 seen, in any form. e.g. 900 000 000, 9×10^8 , 90×10^7
provided $0 < ans < 1$ (b) 40 1 (b) 40 2 * or B1 for $n(B \cap S) = 10$ soi 10 (a) $T = \frac{36}{L^2}$, or $\left(\frac{6}{L}\right)^2$ (b) $(\pm)\frac{6}{5}$ o.e. 1	8	(a)	(i) 0.25 o.e.	1	e.g. ¹ / ₄
9 (a) 1 (b) 9 2 2* or B1 for $n(B \cap S) = 10$ soi 10 (a) $T = \frac{36}{L^2}$, or $\left(\frac{6}{L}\right)^2$ 2 or sc1 for $\frac{constant}{L^2}$ (b) $(\pm)\frac{6}{5}$ o.e. 1				1 √	e.g. $\frac{13}{20}$
(b) 9 $2 * \text{ or } \mathbf{B1} \text{ for } n(B \cap S) = 10 \text{ soi}$ $10 \mathbf{(a)} T = \frac{36}{L^2}, \text{ or } \left(\frac{6}{L}\right)^2$ $\mathbf{(b)} (\pm) \frac{6}{5} \text{ o.e.}$ $2 \text{or } \mathbf{sc1} \text{ for } \frac{constant}{L^2}$		(b)	40	1	
10 (a) $T = \frac{36}{L^2}$, or $\left(\frac{6}{L}\right)^2$ 2 or sc1 for $\frac{constant}{L^2}$ 1 (b) $(\pm)\frac{6}{5}$ o.e.	9	(a)		1	
(b) $(\pm)\frac{6}{5}$ o.e. 1		(b)	9	2 *	or B1 for $n(B \cap S) = 10$ soi
	10	(a)		2	or sc1 for $\frac{constant}{L^2}$
11 (a) 0.15 o.e. 1 e.g. $\frac{3}{20}$, $\frac{150000}{1000000}$		(b)	$(\pm)\frac{6}{5}$ o.e.	1	
	11	(a)	0.15 o.e.	1	e.g. $\frac{3}{20}$, $\frac{150000}{1000000}$
(b) 161.25 2 * or B1 for 1.55 and 6.25 seen		(b)	161.25	2 *	or B1 for 1.55 and 6.25 seen

Page 3 Mark Scheme Syllabus Papuratus Control of the second secon

				C,
12	(a)	$2\frac{1}{2}$, 2.5, $\frac{5}{2}$, or $2\frac{3}{6}$	1	not $\frac{15}{6}$
	(b)	$\frac{3}{2x-4}$ o.e.	2 *	or sc1 for $\frac{3}{2y-4}$ o.e. or B1 for $2xy-4x=3$ o.e. (xs on one side) seen
13	(a)	Circle radius 4 cm, centre S	C 1	Within 2 mm
		Perp. bisector of <i>MF</i>	B 1	Within 2 mm, 2°; at least 2 cm long
	(b)	Correct shading	S 1	(b) and (c) are dep. on B1 and C1
	(c)	10 to 10.4	1	
14	(a)	Triangle with vertices at $(-1,3)$, $(1,3)$ and $(1,4)$	1	
	(b)	Reflection $y = -x$ or equiv. equation	1 1	
	(c)	$\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$	1	
15	(a)	$\begin{pmatrix} 7 & -6 \\ 7 & -3 \end{pmatrix}$	2	or B1 for 3 correct elements
	(b)	$\begin{pmatrix} 0 & 1 \\ -\frac{1}{3} & 1\frac{1}{3} \end{pmatrix} \text{ or } \frac{1}{3} \begin{pmatrix} 0 & 3 \\ -1 & 4 \end{pmatrix}$	2	Accept decimals to 2 d.p. or better. or sc1 for using $\frac{1}{3}$, or $\begin{pmatrix} 0 & 3 \\ -1 & 4 \end{pmatrix}$
16	(a)	x > -1	2	or sc1 for $-1 \le x$
	(b)	y = 10	2*	or B1 for a correct removal of brackets e.g. $3y + 6 = 4y - 14 + y$ or $3y + 6 = 5y - 14$ or $20 = 2y$ seen
17	(a)	1.7 to 1.71	1	
	(b)	(i) Straight line passing through (0, 15) and (3, 0)	1	
		(ii) (2.1, 4.5) f.t. from their intersection to within 1 mm on each axis	1 √	x rounds to 2.1, $4 \le y \le 5$; Only f.t. for inclined lines.
		(iii) $a = 20$ and $b = -5$	1	

			nun nu nun
Page 4	Mark Scheme	Syllabus	Pap Thou Tour
	GCE O LEVEL – October/November 2008	4024	01

10	(.)	(D) 2220	1	30,
18	(a)	(i) 233°	1	
		(ii) 305°	1	
	(b)	10 18 (a.m.)	2 *	or B1 for 2.8 o.e.(e.g. 2h 48min) seen
				or for $\frac{70}{25}$ seen
				25
19	(a)	(i) 3400	1	
		(ii) 4	2 *	or B1 for $\frac{200}{5000}$ o.e. (e.g. 0.04, $\frac{1}{25}$) seen
				3000 23
	(b)	4100	2 *	or B1 for 600 seen
20	(a)	(i) 112°	1	
		(ii) 44°	1	
		(iii) 68°	1	
	(b)	52	2 *	or B1 for height = 4 cm seen
				or B1 for $\frac{26 \times their \ height}{2}$ o.e.
				2
21	(a)	$p^2 - p - 20$	1	
	(b)	(i) $(2x+3y)^2$ or $(2x+3y)(2x+3y)$ (ii) $3(m-4)(m+4)$	2	or sc1 for $(x+1.5y)(4x+6y)$ etc
		(ii) $3(m-4)(m+4)$	2	or sc1 for correct, partial factorisation
				e.g. $3(m^2-16)$,
				(3m-12)(m+4),(m-4)(3m+12)
				"Solutions" score 0.
22	(a)	$-0.5 \text{ or } -\frac{1}{2}$	1	
	(I-)		2.1	Durani da di 4h ain (a) in continuo
	(b)	$x + 2y = 10$, o.e. f.t. $y = \text{their}(\mathbf{a}) x + 5$ o.e.	2 √	Provided their (a) is not zero or sc1 for $x + 2y = \text{const.}$
		(1)		or sc1 for $y = \text{their}(\mathbf{a}) x + \text{const.}$ o.e.
	(c)	(i) $y = -2$ drawn	L 1	
		(ii) correct region shaded and labelled	R 1	$\sqrt{\text{if possible: above their line and}}$
				below 1 and above $y = 2x + 1$

							Pap nay
	Pag	e 5	Mark Scheme			Syllabus	Par The State of
			GCE O LEVEL – October/Nove	mber 2	800	4024	01
							01 nschout
23	(a)	(i)	4.55 to 4.65	1			Op
		(ii)	0.9 to 1 (but not from an incorrect UQ	2 *	or B1 for	r 5 to 5.1 and 4.0	5 to 4.15 seen

22	()	(*)	4.55.4.4.65	1	
23	(a)	(i)	4.55 to 4.65	1	
		(ii)	0.9 to 1 (but not from an incorrect UQ or LQ)	2 *	or B1 for 5 to 5.1 and 4.05 to 4.15 seen
	(b)	4.75	or 4 + equiv. fraction	3 *	or M1 for midvalues x frequencies and M1 for $\frac{\sum ft}{\sum f}$ where t is in the interval (or is the lower bound).