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.

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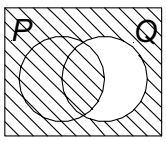
1	**(a)**	0.018 or equiv.	1	e.g. $\frac{9}{500}$, 1.8×10^{-2}
	(b)	1.9 or equiv.	1	e.g. $\frac{19}{10}$
2	**(a)**	$\frac{9}{20}$ cao	1	
	(b)	32.5	1	Accept 32 + equiv. fraction, but not $\frac{65}{2}$, or worse
3	**(a)**	$\frac{8}{15}$ or equiv.	1	Accept 0.53 or better (0.533...)
	(b)	8 cao	1	
4		6 000 000 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	
	(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. $\frac{13}{20}$
	(b)	40	1	
9	**(a)**		1	
	(b)	9	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	
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

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 MF	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)	$\begin{pmatrix} 0 & 1 \\ -\frac{1}{3} & 1\frac{1}{3} \end{pmatrix}$ 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 $-1 < x$
	(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 , $4 \leqslant y \leqslant 5$; Only f.t. for inclined lines.
		(iii) $a = 20$ and $b = -5$	1	

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
19	**(a)**	**(i)** 3400	1	
		(ii) 4	2 *	or **B1** for $\frac{200}{5000}$ o.e. (e.g. 0.04, $\frac{1}{25}$) seen
	(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 $\frac{26 \times \textit{their height}}{2}$ o.e.
21	**(a)**	$p^2 - p - 20$	1	
	(b)	**(i)** $(2x+3y)^2$ or $(2x+3y)(2x+3y)$	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 or $-\frac{1}{2}$	1	
	(b)	$x + 2y = 10$, o.e. f.t. y = their**(a)** $x + 5$ o.e.	2 √	Provided their **(a)** is not zero or **sc1** for $x + 2y$ = const. or **sc1** for y = their**(a)** x + const. o.e.
	(c)	**(i)** $y = -2$ drawn	L 1	
		(ii) correct region shaded and labelled	R 1	√ if possible: above their line and below 1 and above $y = 2x + 1$

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 s
	(b)	4.75 or 4 + equiv. fraction	3 *	or **M1** for midvalues x frequencies **and M1** for $\frac{\Sigma ft}{\Sigma f}$ where t is in the interval (or is the lower bound).