

## MARK SCHEME for the October/November 2008 question paper

<b>4024/01</b>	<b>4024 MATHEMATICS</b> Paper 1, maximum raw mark 80
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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.

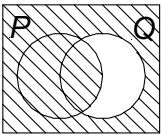
All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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.

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

1	(a)	0.018 or equiv.	1	e.g. $\frac{9}{500}$ , $1.8 \times 10^{-2}$
	(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 <b>sc1</b> for 6 000 (00...) in Ans. space or <b>B1</b> 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)	$7 \times 10^2$	1	
	(b)	$9.21 \times 10^8$	2 *	or <b>B1</b> for correct evaluation of $n^2$ seen, in any form. e.g. 900 000 000, $9 \times 10^8$ , $90 \times 10^7$
8	(a) (i)	0.25 o.e.	1	e.g. $\frac{1}{4}$
	(a) (ii)	0.65 o.e. f.t. their (a) + 0.4 provided $0 < \text{ans} < 1$	1 $\checkmark$	e.g. $\frac{13}{20}$
	(b)	40	1	
9	(a)		1	
	(b)	9	2 *	or <b>B1</b> for $n(B \cap S) = 10$ soi
10	(a)	$T = \frac{36}{L^2}$ , or $\left(\frac{6}{L}\right)^2$	2	or <b>sc1</b> for $\frac{\text{constant}}{L^2}$
	(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 <b>B1</b> for 1.55 and 6.25 seen

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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 <b>sc1</b> for $\frac{3}{2y-4}$ o.e. or <b>B1</b> for $2xy - 4x = 3$ o.e. (xs on one side) seen	
13	(a)	Circle radius 4 cm, centre <i>S</i> Perp. bisector of <i>MF</i>	C 1 B 1	Within 2 mm Within 2 mm, 2°; at least 2 cm long	
	(b)	Correct shading	S 1	(b) and (c) are dep. on <b>B1</b> and <b>C1</b>	
	(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 <b>B1</b> 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 <b>sc1</b> for using $\frac{1}{3}$ , or $\begin{pmatrix} 0 & 3 \\ -1 & 4 \end{pmatrix}$	
16	(a)	$x > -1$	2	or <b>sc1</b> for $-1 < x$	
	(b)	$y = 10$	2 *	or <b>B1</b> 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 $\checkmark$	$x$ rounds to 2.1, $4 \leq y \leq 5$ ; Only f.t. for inclined lines.
		(iii)	$a = 20$ and $b = -5$	1	

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18	(a)	(i) $233^\circ$	1	or <b>B1</b> for 2.8 o.e. (e.g. 2h 48min) seen or for $\frac{70}{25}$ seen
		(ii) $305^\circ$	1	
	(b)	10 18 (a.m.)	2 *	
19	(a)	(i) 3400	1	or <b>B1</b> for $\frac{200}{5000}$ o.e. (e.g. 0.04, $\frac{1}{25}$ ) seen or <b>B1</b> for 600 seen
		(ii) 4	2 *	
	(b)	4100	2 *	
20	(a)	(i) $112^\circ$	1	or <b>B1</b> for height = 4 cm seen or <b>B1</b> for $\frac{26 \times \text{their height}}{2}$ o.e.
		(ii) $44^\circ$	1	
		(iii) $68^\circ$	1	
	(b)	52	2 *	
21	(a)	$p^2 - p - 20$	1	or <b>sc1</b> for $(x + 1.5y)(4x + 6y)$ etc or <b>sc1</b> for correct, partial factorisation e.g. $3(m^2 - 16)$ , $(3m - 12)(m + 4)$ , $(m - 4)(3m + 12)$ “Solutions” score 0.
	(b)	(i) $(2x + 3y)^2$ or $(2x + 3y)(2x + 3y)$	2	
		(ii) $3(m - 4)(m + 4)$	2	
22	(a)	$-0.5$ or $-\frac{1}{2}$	1	Provided their (a) is not zero or <b>sc1</b> for $x + 2y = \text{const.}$ or <b>sc1</b> for $y = \text{their(a)} x + \text{const. o.e.}$  $\checkmark$ if possible: above their line and below 1 and above $y = 2x + 1$
	(b)	$x + 2y = 10$ , o.e. f.t. $y = \text{their(a)} x + 5$ o.e.	2 $\checkmark$	
	(c)	(i) $y = -2$ drawn	L 1	
		(ii) correct region shaded and labelled	R 1	

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