UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2009 question paper

for the guidance of teachers

0580, 0581 MATHEMATICS

0580/21, 0581/21 Paper 2 (Extended), maximum raw mark 70

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, which would have considered the acceptability of alternative answers.

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

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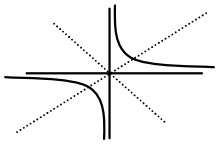
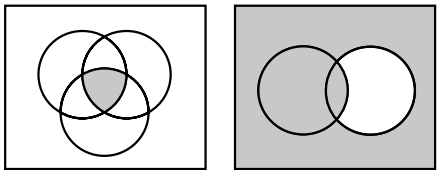
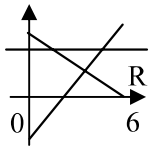
Page 2	Mark Scheme: Teachers' version	Syllabus	Paper
	IGCSE – May/June 2009	0580, 0581	21

Abbreviations

cao	correct answer only
ft	follow through after an error
oe	or equivalent
SC	Special Case
www	without wrong working

1 **(a)**	2	1	Any length, can be freehand lines solid or dotted
(b)		1	Mark lost if additional lines drawn or axes extended
2	$\frac{5}{7}$ 72% $\sqrt{\frac{9}{17}}$ $\left(\frac{4}{3}\right)^{-1}$	2	**M1** correct decimals 0.727(6…) 0.71(4…) 0.72 0.75
3 **(a)**	06 41	1	Allow 6.41(am). 6:41 and 06:41 Not 6h41m or 641h or 6.41pm
(b)	\$204	1	
4		1, 1	
5	$\frac{1}{2}\begin{pmatrix}5 & -3\\4 & -2\end{pmatrix}$ or $\begin{pmatrix}2.5 & -1.5\\2 & -1\end{pmatrix}$	2	**M1** det **A** or $\lvert\mathbf{A}\rvert$ or $5\times{-2}-4\times{-3}=2$ or $\begin{pmatrix}5 & -3\\4 & -2\end{pmatrix}$ or $\frac{1}{2}\begin{pmatrix}a & b\\c & d\end{pmatrix}$ seen Allow 5/2, –3/2, 4/2, –2/2 in matrix
6	62225000 or 6.2225×10^7 or 62.225 million cao	2	**M1** 9.5(million) **and** 6.55 seen 3sf **not** appropriate for UB and **not** allowed for 2 marks
7	(4, 2)	2	**M1** $\frac{2+6}{2}$ and $\frac{-5+9}{2}$ oe or a drawing used correctly

8 (a)	$2\mathbf{a} - \mathbf{g}$ cao	1	$-\mathbf{g} + 2\mathbf{a}$
(b)	$2\frac{1}{2}\mathbf{a} + \frac{1}{2}\mathbf{g}$ oe cao	1	Allow 2.5 or $\frac{5}{2}$ and 0.5
9	$(9(1-x))^2$ oe	3	**M1** 1 move completed correctly **M1** 1 more move completed correctly Mark 3rd move in answer space
10	$\frac{2}{c}$	3	**M1** $d + c - c + d$ or better **M1** common denominator cd used
11	£3000	3	**M1** 1.96×25000 **M1** "49000" / 1.75
12	$x = 4$ $y = -3$	3	**M1** consistent multiplication and subtraction of **their** rearranged eqns. Any other answers must first score M1 to gain an A mark Substitution, matrix and equating methods also permitted
13	0.128	3	**M1** $t = k/d^2$ k is any letter except t, d or α **A1** $k = 12.8$ or **M1** $0.2 \times 8^2 = 12.8$
14 (a)	3×10^{11}	2	**M1** $60 \times 5 \times 10^9$ or better
(b)	5 000 000 or 5×10^6 or 5 million	2	**M1** $0.8 \times 10^7 - 3 \times 10^6$ oe or **M1** $5x = 4 \times 10^7 - 15 \times 10^6$ oe If m is used for a million it must be used consistently
15 (a)	24.7	2	**M1** sin18 = AB/80 or cos72 = AB/80 Allow AB/sin18 = 80/sin90
(b)	11.5	2	**M1** tan25 = h/**(a)** or h/sin25 = **(a)**/sin65
16	Angle bisector of angle in the middle Second angle bisector drawn	4	**W1** correct bisector drawn **W1** at least two arcs drawn on the arms and one pair of correct crossing arcs **W1** as above **W1** as above Accuracy ±1° but line must go from edge to edge.

17 (a)	Reflection in $y = x$	2	**M1** Reflection **A1** correct description of the line
(b)	Triangle at (4,6), (4, 7), (7, 7)	2	**M1** Rotation 90° clockwise **A1** position
18 (a)	320	2	**M1** $1080 \times 8/27$ or $(2/3)^3$ or $1080 \div 27/8$ or $(3/2)^3$
(b)	567	2	**M1** $252 \times 9/4$ or $(3/2)^2$ or $252 \div 4/9$ or $(2/3)^2$
19	314	4	**M1** $\pi . 18^2 . 40/360$ or $OAD = 113$ identified **M1** $\pi . 6^2$ (or $\pi . 6^2 .$ **40**/360) or OBC …"……. **M1** $2 \times (OAD - OBC)$ + circle oe **OR** **M1** $\pi . 18^2 . 40/360$ **M1** $\pi . 6^2 .$ **140**/360 **M1** $2 \times OAD + 2 \times BOE$ oe
20	draw $2x - y = 4$ draw $x + y = 6$ draw $y = 4$ correct region identified by R	2 1 1 1	**W1** Line through (2,0) or (0,–4) 
21 (a)	$\begin{pmatrix} 2x+12 & 3x+6 \\ 14 & 15 \end{pmatrix}$	2	**M1** for any correct row or column Allow $2(x + 6)$, $3(x + 2)$
(b)	5	3	**M1** $\begin{pmatrix} 2x+12 & 21 \\ 2x+4 & 15 \end{pmatrix}$ one row (or column) correct **M1** $2x + 4 = 14$ or $3x + 6 = 21$
22 (a)	58	1	
(b)	32	1	
(c)	58	1 ft	= **(a)**
(d)	24	2	