UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2008 question paper

0580/0581 MATHEMATICS

0580/22 and 0581/22 Paper 22 (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.

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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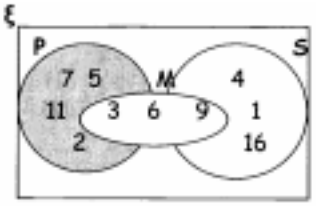
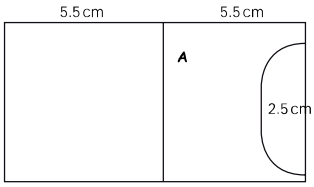
Page 2	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2008	0580/0581	22

1	59 and 61	1, 1	independent of each other
2	$\frac{13x}{18}$	2	**M1** $\frac{6x}{18}+\frac{14x}{18}-\frac{7x}{18}$ **oe** fractions with common denom. not decimals
3	140	2	**M1** $\frac{21}{15}\times 100$
4	**(a)** 1240 **(b)** $(n+4)^2+1$	1 1	**cao** Allow $n^2+16n+17$, $(n+3+1)^2+1$, $(n-1+5)^2+1$ **oe**
5	\$308.41 **cao**	2	**M1** 330 / 1.07 or 330 × 0.93(4579...) Allow **M1** 308, 308.4(1...)
6	$\frac{598}{601}$ $\frac{399}{401}$ $\frac{698}{701}$	2	**M1** correct decimals seen 0.99501.... 0.9957(2…) 0.99500… First and third must be to at least 5sf Accept these decimals in answer space
7	**(a)** 2045.49 **cao** **(b)** 2000	1 1	 Allow 2.0×10^3
8	$8x^3$	2	**B1** 8 **B1** x^3 terms must be multiplied
9	$y=\frac{1}{2}x+7$	3	**M1** $(m=)\ \frac{10-7}{6-0}$ **oe B1** $(c=)$ 7 **or** **M1 A1** $y-10=\frac{1}{2}(x-6)$ or $y-7=\frac{1}{2}(x-0)$ Allow 3/6 for the $\frac{1}{2}$ **A1** $y=\frac{1}{2}x+7$ or $2y-x=14$ **oe**
10	$r=24$ $h=36$ **cao www**	3	**M1** Length scale factor of 6 **used or stated Al Al**
11	(±) 7.21	3	**M1** $26^2=(3x)^2+x^2-2.3x.x.\cos 120$ **oe** **M1** $676=13x^2$
12	**(a)**  **(b)** 4	2 1√	**B1** P and S not intersecting. Two sets must be labelled Three intersecting circles will have P ∩ S empty. from the number of elements in the shaded area
13	$x<-23\frac{1}{2}$ or –23.5	3	**M1** 2 moves **completed** correctly **M1** 2 more moves completed correctly

14		1 1 1	Line A in correct place; bisects rectangle Line 2cm long in correct place $\frac{1}{4}$ circles in correct place Not freehand.
15	$\begin{pmatrix} -11 \\ -11 \\ -14 \end{pmatrix}$	1 1 1	
16	(1, 3) **www**	3	**M1** consistent multiplication and subtraction/addition **A1 A1** Allow $x = 1$ and $y = 3$ (1, k) or (k, 3) scores 2 marks **ONLY** if **M1** is scored
17	20	4	**B1** $\frac{370 + x}{500 + x} = \frac{3}{4}$ **oe** fraction, decimal, percentage **M1** two moves completed correctly **M1** two more correct moves completed
18	**(a)** –17	1	
	(b) $2x^3 - 6x^2 + 12x - 17$	2	**M1** attempting to double f(x) and –3
	(c) $\frac{x+3}{2}$	2	**M1** valid method
19	**(a)** Triangle (–1, –2)(–1, –3)(–3, –2)	2	**M1** for one correct vertex of the triangle drawn on the diagram
	Reflection in $y = -x$	2	**M1** for the **word** reflection **A1** $y = -x$ **oe** Combined transformation must be fully correct to the specified answer but –1 once for the details (e.g. centre, angle, etc)
	(b) $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$	2	**B1** each **column or** **M1** solving two pairs of sim. equations **A1** all correct in matrix
20	**(a)** 12900	3	**M1** $(160^2$ **or** $100^2) \times \pi \times 95/360$ **M1** subtracting the two areas above
	(b) 23300	1√	**(a)** multiplied by 1.8
	(c) **(i)** 2.33×10^{13}	1√	**(b)** $\times 10^9$
	(ii) 1.55×10^{13}	2√	**M1 (c)(i)** / 1.5

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21	**(a)** 11.3	5	**B1** identifying angle FAC **M1** $600^2 + 800^2$ **Al** 1000 (for AC) **M1** tan$x$ = 200/their 1000 (or cos$x$ = "1000"/"1020") **Alternative method via DF and AF** **M1** "($200^2 + 600^2$)" + 800^2 **Al** 1020 **M1** sin$x$/(sin90) = 200/"1020" **oe** cosine rule also possible
	(b) 233	3	**M1** tan$y$ = 800/600 **oe** sin$y$, cos$y$ **M1** an angle found in **(b)** + 180 written in working