UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2011 question paper

for the guidance of teachers

0580 MATHEMATICS

0580/22 Paper 2 (Extended), maximum raw mark 70

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UNIVERSITY of CAMBRIDGE
International Examinations

Abbreviations

cao correct answer only
cso correct solution only
dep dependent
ft follow through after error
isw ignore subsequent working
oe or equivalent
SC Special Case
www without wrong working

Qu.	Answers	Mark	Part Mark
1	53.1	**2**	**B1** C = 36.9 seen, must have C stated or marked on the diagram or **M1** $\sin A = \frac{4}{5}$ or $\tan A = \frac{4}{3}$ but must have A stated
2	$\sqrt{3}+\sqrt{6}$, π	**2**	–1 for each error or omission
3	Working must be shown	**2**	**M1** $\frac{14}{9}$ and $\frac{16}{9}$ **M1** $\frac{14}{16}=\frac{7}{8}$ oe or visible cancelling
4	0.8^2	**2**	**M1** conversion of $\frac{16}{27}$ (= 0.5(9...)) and 0.8^2 (= 0.64) to decimals seen
5	(6)€ or euros (with correct working)	**2**	**M1** one of 6 × 1.9037 or 11.5 ÷ 1.9037 or 11.5 ÷ 6 seen
6	3.322 cao	**2**	**B1** 3.3219(…) or 3.32(20) seen
7	1.85×10^4	**3**	**B2** 18500 oe seen or **M1** $4x = 74000$ or $x = 2 \times 10^4 - 1.5 \times 10^3$
8	16	**3**	**M1** $p = k\sqrt{q}$ **A1** $k = 1.6$ or 8/5
9	1275, 1425	**3**	**B1** 85 or 95 or 0.85 or 0.95 **M1** their LB or UB × 1500 where 85 ⩽ LB < 90 90 < UB ⩽ 95
10	**(a)** (0)700 or 7 am **(b)** 1700 or 5 pm	**2** **1**	**M1** 100 – (5 × their(22 – 6) + their(13 – 8)) or better soi
11	$\frac{4+bc}{c}$ or $\frac{4}{c}+b$ cao	**3**	**M1** correct move completed **M1** second correct move completed **M1** third correct move completed
12	$x = 1$ $y = 0.2$ or $\frac{1}{5}$ only	**3**	**M1** consistent mult and add/subtraction **A1** one value correct after **M** awarded
13	**(a)** 72 **(b)** 36 **(c)** 54	**1** **1** **2ft**	ft 90 – **(b)** **M1** $POQ = 108$

14	**(a)** 84	**1**	
	(b) 15	**1**	
	(c) 6.28	**2**	**M1** $\frac{120}{360} \times 2 \times \pi \times 3$ oe
15	$\frac{1-3x}{(x+1)(x+5)}$ www	**4**	**M1** $(x+1)^2 - x(x+5)$ oe **B1** $x^2 + x + x + 1$ **B1** denominator(s) $(x+1)(x+5)$ or $x^2 + 6x + 5$
16	**(a)** $\frac{1}{2}$ **a** – $\frac{1}{2}$ **c** oe	**2**	**M1** correct but unsimplified e.g. $\frac{1}{2}$ **a** + – $\frac{1}{2}$ **c**
	(b) $\frac{3}{4}$ **a** + $\frac{3}{4}$ **c** oe	**2**	**M1** correct but unsimplified
17	**(a)** $4x^{-24}$ or $\frac{4}{x^{24}}$	**2**	**B1** $4x^n$ **B1** $\frac{k}{x^{24}}$ or kx^{-24} for any numerical k, n
	(b) $\frac{x^2}{16}$	**2**	**B1** $\frac{x^2}{k}$ or **B1** $\frac{x^n}{16}$ **SC1** $(\frac{x}{4})^2$
18	**(a)** (6, 1½)	**1**	
	(b) $y = -\frac{1}{5}x + 4$ oe	**3**	**B1** correct numerical format **B1** correct m **B1** correct c
19	**(a)** 8	**1**	
	(b) $4x - 9$	**2**	**M1** $2(2x - 3) - 3$ seen
	(c) $2^{2(x+1)}$ or 2^{2x+2} or 4^{x+1}	**2**	**M1** $(2^{x+1})^2$ seen
20	**(a)** **(i)**	**2**	**B1** correct line **B1** 2 sets of correct arcs
	(ii) R	**2**	**B1** correct line **B1** two sets of correct arcs
	(b)	**1**	correct region, shaded or shown by the letter R
21	**(a)** **(i)** (0) brackets essential	**2**	**M1** $6 \times 2 + 3 \times -4$ or $12 + -12$
	(ii) $\begin{pmatrix} 12 & 18 \\ -8 & -12 \end{pmatrix}$	**2**	**M1** any 2 × 2 matrix with 2 elements correct
	(b) $\frac{1}{2}\begin{pmatrix} 1 & -1 \\ -1 & 3 \end{pmatrix}$	**2**	**B1** $\frac{1}{2}\begin{pmatrix} a & c \\ b & d \end{pmatrix}$ seen or **B1** $k\begin{pmatrix} 1 & -1 \\ -1 & 3 \end{pmatrix}$ seen