UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2012 question paper

for the guidance of teachers

0580 MATHEMATICS

0580/23 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
soi seen or implied

Qu	Answers	Mark	Part marks
1	95	**2**	**B1** for 85 seen or **M1** x = 180 – their angle ADC, if it is clearly seen
2	120	**2**	**M1** for $\frac{750\times2\times8}{100}$ oe seen or **SC1** 870 as final answer
3 (a)	3.26077…	**1**	seen
(b)	3.261	**1ft**	their (a) to 4 significant figures
4	$y \varnothing -1.25$	**2**	**M1** inequality with y's and constants correctly collected
5	33 **cao www**	**2**	**M1** any two of 5.5, 9.5, 12.5 seen
6	31.7	**2**	**M1** 0.5 × 9 × 15 × sin 28
7	u = 24(.0), v = 0.6	**2**	**B1** each
8	7 cao	**3**	**B1** for 39.5(0) or 31.5(0) or 42 **M1** for (their 39.5 – 8) ÷ 4.5 or (their 42 – 10.5) ÷ 4.5
9	$\frac{a(2-t)}{3}$ cao oe	**3**	**M1** correct re-arrangement to isolate the term in w **M1** correct multiplication by a **M1** correct division by their 3 An incorrect answer scores a maximum of **M2**
10	10	**3**	**M1** T = k$\sqrt{l}$ **A1** for k = 2
11	17.05 **cao www**	**4**	**M1** for 280 × $(1+\frac{3}{100})^2$ oe **M1** subtracting 280 from 280$(1+\frac{k}{100})^2$ any k **A1** for 17.052 or **SC2** 297.05 on answer line

12	**(a)**	$\frac{11}{12}-\frac{4}{12}$ oe $\frac{7}{12}$ **cao ww 0**	**2**	**M1** correct use of a common denominator **A1**
	(b)	$\frac{1}{4}\times\frac{13}{11}$ oe $\frac{13}{44}$ **cao ww 0**	**2**	**M1** inversion and operation change **A1**
13	**(a)**	71	**2**	**M1** for $7\times8-3\times-5$ or **B1** 56 and –15
	(b)	$3v\,(u+3w)$ final answer	**2**	**B1** for $3(uv+3vw)$ or $v\,(3u+9w)$ As final answer
14	**(a)**	$64p^3q^6$	**2**	**B1** $64p^uq^v$ or kp^3q^6
	(b)	$0.5x^{-2}$ or $\frac{1}{2x^2}$ oe	**2**	**B1** $\frac{1}{2x^u}$ oe or $\frac{1}{kx^2}$ oe
15		–3.44, 0.44 correct working must be shown	**4**	**B1** for $\sqrt{(6)^2-4(2)(-3)}$ or better seen **B1** if in form $\frac{p+(or-)q}{r}$, for $p=-6$ **and** $r=2\times2$ oe **B1**, **B1** (**SC1** –3.4 or –3.436… **and** 0.4 or 0.436...)
16		359 www	**4**	**M1** $\pi\times4^2$ or $\frac{1}{2}\pi\times4^2$ **M1** for $0.5\times\pi\times8\times15$ oe **M1** for 8×15 + their 2 ends + their curved surface area
17	**(a)**	(4 10)	**2**	**B1** each element or correct without brackets
	(b)	$\frac{1}{2}\begin{pmatrix}3&-4\\-1&2\end{pmatrix}$ oe	**2**	**B1** for $\frac{1}{2}\begin{pmatrix}a&c\\b&d\end{pmatrix}$ or $k\begin{pmatrix}3&-4\\-1&2\end{pmatrix}$ seen
18	**(a)**	$\mathbf{p}-\frac{1}{3}\mathbf{q}$ oe	**2**	**M1** $\overrightarrow{QR}+\overrightarrow{RX}$ oe or $-\mathbf{q}+\mathbf{p}+(\frac{2}{3})\mathbf{q}$ oe
	(b)	$\frac{1}{2}\mathbf{p}+\frac{5}{6}\mathbf{q}$ oe	**2 ft**	ft $\mathbf{q}+\frac{1}{2}$ their (a) but must be vectors or **M1** for $\overrightarrow{OQ}+\overrightarrow{QM}$ oe
19		6(.00) **www**	**4**	**M1** use of area = distance **M1** complete, correct set of area statements, ignoring units **M1** changing min to hours or km/h to km/min

20		$\frac{x+4}{x(x-5)}$ oe cao	**5**	**B2** $(x-5)(x+4)$ seen or **SC1** $(x+a)(x+b)$ where $ab = -20$ or $a+b=-1$ **B2** $x(x-5)(x-5)$ or **B1** one of $x(x^2-10x+25)$, $(x-5)(x-5)$, $(x-5)(x^2-5x)$ seen
21	**(a)**	7.55 www	**3**	**M2** $(\frac{1}{2}\sqrt{(8^2+8^2)})^2+5^2$ or $4^2+5^2+4^2$ seen **or M1** 8^2+8^2 or 5^2+4^2 or 4^2+4^2 or 5^2+(their MB)^2 seen
	(b)	41.5 www	**3**	**M2** $\sin(B) = \frac{5}{(a)}$ or $\tan(B) = \frac{5}{\text{their } MB}$ or $\cos(B) = \frac{\text{their } MB}{(a)}$ or **M1** recognition of angle PBM