UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2010 question paper

for the guidance of teachers

0580 MATHEMATICS

0580/31 Paper 31 (Core), maximum raw mark 104

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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
art anything rounding to
soi seen or implied

Qu.	Answers	Mark	Part Marks
1 (a)	720	2	M1 $\frac{32\times 2250}{100}$
(b) (i)	80	2	M1 $\frac{2}{2+7}\times 360$
(ii)	$\frac{4}{25}$	2	W1 for 180/1125, 120/750, 72/450, 60/375, 36/225, 24/150, 12/75, 20/125, 8/50
(c)	2655	3	M2 $\frac{118}{100}\times 2250$ oe If M0 then M1 for $\frac{18}{100}\times 2250$ or 405 seen
(d)	2.25×10^3 cao	1	
(e)	1765 cao	1	
2 (a) (i)	122	2	M1 for $2 \times 19 + 2 \times 42$ oe
(ii)	160	3	M2 for $\frac{1}{2}(19+13)\times 10$ oe SC1 for rectangle 130 or triangle 30, 65, 95
(iii)	6720 or their **(a)(ii)** × 42 evaluated	2ft	M1 their **(a)(ii)** × 42
(b)	26.88 or their **(a)(iii)** × 0.004 evaluated or 26.9	3ft	M1 their **(a)(iii)** × 4 soi M1 division by 1000 soi

3 (a)	6 points correctly plotted	3	P2 for 4 or 5 points, P1 for 2 or 3 points
(b)	negative cao	1	
(c) (i)	8 cao	1	
(ii)	art 5.92	3	M1 for attempt to add the 12 values (for time) implied by 71 M1 dep for division by 12 SC1 for 23.4
(d) (i)	26 cao	1	
(ii)	23.5 cao	1	
(e) (i)	$\frac{2}{12}$ oe	1	0.166 or 0.167 or 16.6% or 16.7%
(ii)	$\frac{3}{12}$ oe	2	0.25 or 25% SC1 for (4,28) (2,26) (3,30) listed or ringed on diagram or table
4 (a) (i)	art 4.77	3	M2 for $BN = 8.6 \times \tan 29$ oe or M1 for $\frac{BN}{8.6} = \tan 29$ oe
(ii)	art 50.1°	2	M1 for $\cos CAN = 8.6 \div 13.4$
(b)	10.2 to 10.3	3	M1 for $13.4^2 - 8.6^2$ (105.6) M1 dep for $\sqrt{13.4^2 - 8.6^2}$
5 (a) (i)	correct image	2	B1 for translation by $\begin{pmatrix}4\\k\end{pmatrix}$ or $\begin{pmatrix}k\\-3\end{pmatrix}$ or $\begin{pmatrix}-3\\4\end{pmatrix}$
(ii)	correct image	2	B1 for figure of correct size and orientation in wrong position
(iii)	correct image	2	B1 for reflection in y-axis or in any horizontal line.
(b)	Reflection, $x = -2$	2	B1 each
(c)	Rotation, origin, 90° (anti-clockwise or +90°)	3	B1 each accept 270° clockwise, –270°,1/4

6 (a)	–1.5 –10 10 6 1.2	3	B2 for 3 or 4 correct, B1 for 2 correct
(b)	14 points plotted accurately 2 smooth correct curves No part across *y*-axis	P3ft C1 B1	P2ft for 11, 12 or 13 points, P1ft for 8, 9 or 10 Indep
(c)	0.4 to 0.5	1	
(d)	–3 –1 1	2	B1 for 2 correct
(e)	Ruled line from (–3, –3) to (3, 1)	2	SC1 for freehand or short ruled line – must meet curve twice or P1 for their 3 points plotted
(f)	(–1.5, –2) and (3, 1)	1, 1	
7 (a)	–3	2	1 for correct substitution seen
(b)	8	2	M1 for $37-5=4d$ oe
(c)	$\frac{S-a}{4}$	2	M1 for one correct step seen
8 (a)	314.60	3	M1 for $\frac{275\times4\times3.6}{100}$ or 39.6 M1 dep for their interest added to 275
(b)	703.04	3	M2 for 650×1.04^2 or M1 for 650×1.04 oe (implied by 676) and M1 dep for second year
(c) (i)	314.28	2	M1 for 400×0.7857
(ii)	627.55 or 627.54	3	M1 for $400\div0.6374$ soi A1 627.54…, 628, 627.5 B1 **indep** for their visible answer **corrected** to 2dp Penalise accuracy only once in the question
9 (a) (i)	9 or 8.9 to 9.1	1	
(ii)	53 – 55	1	
(b)	compass drawn circle centre *C* radius 7 cm	2	SC1 incomplete accurate circle SC1 any complete circle centre *C*
(c)	correct line drawn with angle *BCX* = 67°	2ft	SC1 for *BCX* = 113° or *BCX* = 67° inside triangle or *BCX* = 67°, *CX* not = 7
(d)	in range 9.3 – 9.9	1ft	Strict ft from **(c)**
(e)	ruled accurate angle bisector of **their** *CBX* with 2 pairs of arcs	2ft	SC1 if accurate but without arcs or M1 for 2 pairs of arcs

10 (a) (i)	5	1	
(ii)	10	1	
(iii)	n	1	
(b) (i)	9	1	
(ii)	19	1	
(iii)	$2n - 1$ oe	2	SC1 for $2n + k$ oe or $jn - 1$, j not = 0
(c) (i)	45	1	
(ii)	5×9	1	Accept height × width
(iii)	$n(2n - 1)$ oe or n(their **(b)(iii)**)	1ft	Their **(a)(iii)** × their **(b)(iii)**