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

0581 MATHEMATICS

0581/31   Paper 31 (Core), maximum raw mark 104

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.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the May/June 2010 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

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 $\dfrac{32 \times 2250}{100}$
(b) (i)	80	2	M1 $\dfrac{2}{2+7} \times 360$
(ii)	$\dfrac{4}{25}$	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 $\dfrac{118}{100} \times 2250$ oe If M0 then M1 for $\dfrac{18}{100} \times 2250$ 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 $\dfrac{1}{2}(19+13) \times 10$ oe SC1 for rectangle 130 or triangle 30, 65, 95
(iii)	6720 or their **(a)(ii)** $\times$ 42 evaluated	2ft	M1 their **(a)(ii)** $\times$ 42
(b)	26.88 or their **(a)(iii)** $\times$ 0.004 evaluated or 26.9	3ft	M1 their **(a)(iii)** $\times$ 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)	$\dfrac{2}{12}$ oe	1	0.166 or 0.167 or 16.6% or 16.7%
(ii)	$\dfrac{3}{12}$ 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 $\dfrac{BN}{8.6} = \tan 29$ 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 =4*d* oe
(c)	$\dfrac{S-a}{4}$	2	M1 for one correct step seen
8 (a)	314.60	3	M1 for $\dfrac{275\times4\times3.6}{100}$ 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 ÷ 0.6374 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 wiithout 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)**