UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2007 question paper

0580 and 0581 MATHEMATICS

0580/03 and 0581/03   Paper 3 (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.

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.

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

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1	(a) (i)	1	B1	
	(ii)	8 or −8 or ±8	B1	
	(iii)	4	B1	Not −4
	(iv)	6	B1	
	(b) (i)	3	B1	
	(ii)	Multiple of 60	B1	
	(c) (i)	9	B1	
	(ii)	3 and 223	B1,B1	
				[9]

2	(a)	$336 - \dfrac{2}{7} \times 336$ or $\dfrac{5}{7} \times 336$	M1	
		(=) 240	E1	240 must be seen for this mark
	(b)	$\dfrac{5 \div \text{their}(5+4+3) \times 240}{100}$	M1 A1cao	www 2
	(c)	$3 \div \text{their}(5+4+3) \times 240 \times 12$	M1	Allow 2880 for 240×12 and $\dfrac{1}{4}$ for $\dfrac{3}{12}$.
		(=) 720	E1	720 must be seen for this mark
	(d)	720×1.06^2 oe	M2	Implied by 88.99(2) or 89(total interest)seen M1 for 720×1.06 (implied by 763.2 seen)
		808.99(2) or 809	A1	SC1 for 806.(4) (Simple Interest) www 3 for 808.99(2) or 809
				[9]

3	(a) (i)	360	B2	M1 for $\frac{1}{2} \times 5 \times 12^2$oe
	(ii)	7.5oe	B2	M1 for 225 /4 oe (implied by 56.25)
	(iii)	$\frac{2E}{v^2}$ or $E\Big/\frac{1}{2}v^2$	B2	B1 for 2E or $E\Big/\frac{1}{2}$ or division by v^2
	(b)	$xy(y-x)$ final answer	B2	B1 for $x(y^2 - xy)$ or $y(xy - x^2)$ SC1 for $xy(y + x)$
	(c)	$3x - 15 + 28 - 6x \ (= 7)$ $13 - 3x \ (= 7)$ $x= 2$	MA1 M1ft A1cao	Independent $ax + b$ (=7) from their expansion www 3
	(d)	Equating coefficients of x or y, or equivalent method. $5y = 5$ oe or $10x = 30$ oe $x = 3, y = 1$	M1 A1 A1	or a correctly substituted substitution. E.g. $y = 13 - 4x \Rightarrow 2x + 3(13 - 4x) = 9$ www 3 [14]
4	(a) (i)	$-10, -20, -60, 30, 20, 15$	B2	B1 for -20 ($x = -3$) or 20 ($x = 3$)
	(ii)	Their 12 points plotted correctly. Smooth curves through all points.	P3ft C1	P2ft for 10 or 11 points correct. P1ft for 8 or 9 points or 1 quadrant correct. Two distinct curves; no part of curves between $x = -1$ and $x = 1$
	(b)	2	B1	
	(c)	Correct lines ruled	B1,B1	Minimum length from $x = -3$ to $x = 3$.
	(d) (i)	(2.4 to 2.5, 24 to 25) (-2.4 to -2.5, -24 to -25)	B1ft B1ft	ft their points of intersection ft their points of intersection
	(ii)	$y = 10x$ oe	B1	cao
	(e)	-10	B1	cao [13]

5	(a) (i)	135 (green)	B1	
	(ii)	75 (yellow)	B1	
	(iii)	Ruled lines correct to 2° 3 correctly labelled sectors	B1ft B1	Only if **(a)(i)** + **(a)(ii)** = 210°. Independent of previous marks
	(b) (i)	$\frac{10}{24}$ oe	B1	Accept decimals, percentages
	(ii)	$\frac{15}{24}$ oe	B1	
	(iii)	$\frac{19}{24}$ oe	B1	
	(c) (i)	0	B1	SC1 for $\frac{0}{12}$ and $\frac{12}{12}$ or $\frac{0}{24}$ and $\frac{24}{24}$
	(ii)	1	B1	
	(d)	Labelled arrows correctly positioned by eye	B3ft	1 mark for each. ft their probabilities from **(b)**. [12]
6	(a) (i)	(180 – 56)/2	B1	Alt. 90 – (56 ÷ 2)
	(ii)	art 2.82	B2	M1 for 6cos 62° (implied by 2.8) Long method must be complete.
	(iii)	5.63 to 5.64	B1ft	2 × their **(a)(ii)**
	(iv)	5.3 or art 5.30	B2	M1 for 6sin 62°oe Long method must be complete.
	(b)(i)	29.8 to 29.9	B2ft	M1 for their **(a)(iii)** × **(a)(iv)**
	(ii)	art 12.5	B2ft	M1 for $0.5 \times \pi \times$ (their **(a)(ii)**^{2})
	(iii)	42.3 to 42.4	B1ft	ft is their **(b)(i)** + **(b)(ii)**
	(c)(i)	21100 to 21200	B2ft	M1 for their **(b)(iii)** × 500
	(ii)	$\left(\frac{500}{60} \times \frac{3600}{1000} \right)$ oe	M2	M1 for figs 500 ÷ figs 60
		30	A1	SC2 for answer of $\frac{1}{2}$ min or SC1 for1km per minute seen. www B3 [16]

7	**(a)**	Trapezium	B1	
	(b) (i)	Translation 9 across, 3 down	B2	B1 for 9 across or 3 down or $\begin{pmatrix} -3 \\ 9 \end{pmatrix}$
	(ii)	Correct reflection	B2	B1 any reflection of ABCD in a line parallel to l.
	(iii)	Correct rotation	B2	B1 90° clockwise rotation of ABCD about A
	(iv)	Correct enlargement	B3	B1 any enlargement of ABCD and B1 any enlargement of ABCD SF 3 or B1 any enlargement of ABCD centre O (not penalise lack of labelling provided intention clear) [10]
8	**(a) (i)**	Diameter from P through O to Q	B1	
	(ii)	90	B1cao	
	(iii)	P to R and Q to R ruled.	B1	
	(iv)	(angle in a) semi-circle	B1	Angle on a diameter. Half the angle at the centre.
	(b) (i)	Bisector of QR with arcs.	B2	SC1 if accurate without arcs. Maximum errors 2mm from mid-point and 2° from perpendicular.
	(ii)	Bisector of PRQ with arcs.	B2	SC1 if accurate without arcs. Maximum error 2° in line from *R*. If wrong line and/or angle used treat as misread each time.
	(c)	Correct Shading	2	Dep. on B2 in **(b)(i)** *and* **(b)(ii)**. SC1 for 'correct' shading but dependent on at least SC1 in **(b)(i)** *and* **(b)(ii)**. [10]

9	(a)	Letter E correctly drawn	B1	
	(b)	22, 29, 36	B3	B1 for each correct number.
	(c) (i)	71	B2	B1 for $7 \times 10 + 1$ or $8 + 9 \times 7$ seen.
	(ii)	$7n + 1$ or $8 + (n - 1) \times 7$ oe	B2	SC1 for $7n + k$ seen. (k is an integer) oe
	(d)	Their **(c)(ii)** = 113 Full method of solution of their equation. 16	B1ft M1ft A1cao	ft any expression involving n. ft only a linear equation. $(113 - k)/$ '7' www B2 [11]