UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2009 question paper

for the guidance of teachers

0580, 0581 MATHEMATICS

0580/03, 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, which would have considered the acceptability of alternative answers.

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UNIVERSITY of CAMBRIDGE
International Examinations

Abbreviations

cao correct answer only
ft follow through after an error
oe or equivalent
SC Special Case
www without wrong working

Qu	Answers	Mark	Part marks
1 (a) (i)	6000 ÷ (7 + 5 + 3)	1	M1 6000 ÷ clear attempt at total
	Multiply by 7	1	M1 Dependent on first mark.
(ii)	(Stephano) 2000 www	1	Must be clearly Stephano.
	(Tania) 1200 www	1	Must be clearly Tania.
(b) (i)	($)47040	2	M1 1.40 × 12 × 2800
(ii)	($)28224	2ft	M1 $\frac{3}{5}$ × '47040' or 0.6 × '47040'
(c)	($)1200	2	M1 5000 × 8 × 3 ÷ 100 SC1 for final answer 6200
(d)	($) 14292	4	M2 $12000 \times (1.06)^3$ Or M1(12000+12000 × 0.06) × 0.06 M1 dep. Correct method for the next 2 years A1cao ($)14292(.19(2)) W1ft Their answer rounded to the nearest dollar. If M0 then maximum SC2 for ($) 2292 or SC1 for ($) 2292.2 or ($) 2292.19(2) or ($) 2300

2	**(a)**	One-third of 360 oe	1	
	(b) (i)	30	1	
	(ii)	90	1	
	(iii)	60	1ft	90 – their **(b) (i)**
	(c) (i)	26(.0) or 25.98(……)	2ft	M1 30cos **(b) (i)** or 30sin(90 – **(b) (i)**) or equivalent **full** method
	(ii)	**(c) (i)**sin **(b) (iii)** oe 22.5	1 1	M1 for correct full method for *AD* W1 dependent on M1
	(d)	48.36 to 48.4	2	M1 tan (*AED*) = $\frac{22.5}{20}$ or cos (*AED*) = $\frac{20}{\sqrt{20^2+22.5^2}}$ or sin(*AED*) = $\frac{22.5}{\sqrt{20^2+22.5^2}}$
3	**(a)**	Horizontal line from (08 30, 30) to (09 30, 30) Line from (their 09 30, 30) to (10 15, 380) Horizontal line from their (10 15, 380) to (10 50, their 380) Line from their (10 50, 380) to (11 30, 420)	W1 W1ft W1ft W1ft	 Only ft from their 09 30 Ft incorrect 10 15 and 380 Ft incorrect 10 50 and 380
	(b) (i)	0.75 or $\frac{3}{4}$ hour	1	
	(ii)	466 to 467	2cao	M1 for 350 ÷ their **(b) (i)**
	(c)	35	3cao	W1ft (air) 3 h 30 mins oe 210 min W1(train) 2 h 55 mins oe 175 min

4	**(a)** **(i)**	$x - 4$	1	
	(ii)	$2x + 5$	1	Allow $x + x + 5$
	(iii)	'$2x + 5$' = 3 × '$(x - 4)$' oe	1ft	Only ft linear expressions in x.
	(iv)	(x =) 17 www	3cao	M1 '$3x - 12$' M1 indep $px = q$ Reducing their equation to a single term in x and a single constant.
	(b)	(x =) 2, (y =) 1.5	3	M1 for complete correct method A1 for 1 correct answer ww both correct W3 ww one correct W0 Multiply and add/subtract. 2 terms correct. Eliminate x: subtract + 2 terms right Eliminate y: add + 2 terms right. Substitution M1 for $3(8 - 4y) - 2y = 3$ or $x + 4\left(\frac{3x-3}{2}\right) = 8$ or $3x - 2\left(\frac{8-x}{4}\right) = 3$ or $\left(\frac{3-2y}{3}\right) + 4y = 8$ or $\left(\frac{3+2y}{3}\right) = 8 - 4y$ or $\left(\frac{3x\pm3}{2}\right) = \left(\frac{8\pm x}{4}\right)$ or better.
5	**(a)**	Reflection in y axis or $x = 0$	2	W1 transformation W1 Line
		Translation $\begin{pmatrix} 8 \\ 0 \end{pmatrix}$ or 8 right (only)	2	W1 transformation W1 vector or description
	(b)	Correct reflected pentagon	2	SC1 A reflected in a horizontal line, not the x axis
	(c)	Correct rotated pentagon	2	SC1 B rotated anti-clockwise 90° about the origin or 90° clockwise about any other point.
	(d)	Rotation, 180, (About) origin oe	3	W1 rotation, W1 180, W1 origin SC3 Enlargement (SF) –1 origin Accept (0, 0) for origin.
	(e)	Correct enlarged pentagon	2	W1 for any enlargement of A with a scale factor of $\frac{1}{2}$.

6	**(a)**	Octagon	1	
	(b)	135	2	M1 for 180 – (360 ÷ 8) oe
	(c) (i)	Angle *OAB* = their **(b)**/2 or angle *AOM* = 90 – their **(b)**/2 4 × tan '67.5' or 4 ÷ tan '22.5' 9.656… or 9.66	W1ft M1 A1cao	67.5 or 22.5 correct values, Dep on W1 **and** M1
	(ii)	38.6 to 38.64	2	M1 for 0.5 × 8 × 9.66
	(iii)	308.8 to 309.12	1ft	Their **(c) (ii)** × 8
	(d)	3705.6 to 3709.44 or 3710	1ft	Their **(c) (iii)** × 12
	(e) (i)	2400	2cao	M1 for 3 × 2 × 2 × 200
	(ii)	35.2(3…) to 35.3(0…)	3cao	M1 for their (**(d)** – **(e) (i)**) soi. M1 for $\frac{(d)-(e)(i)}{(d)} \times 100$ Or M2 for $\left(1-\frac{(e)(i)}{(d)}\right) \times 100$ SC1 for Answer 64.7 to 64.77
7	**(a)**	*x* 0 1 2 3 4 5 6 7 8 9 *y* **0** 8 **14** **18** 20 20 **18** **14** 8 0	3	W2 for 4 correct W1 for 3 correct
	(b)	Their 10 points correctly plotted, within half a square. Smooth curve through the 10 correct points	P3ft C1	P2ft for 8 or 9 correct P1ft for 6 or 7 correct Shape must be correct and the curve goes above *y* = 20.
	(c)	(*x* =) 4.4 to 4.6 (*y* =) 20.1 to 20.5	1cao 1cao	
	(d) (i)	**Ruled** line *y* = 6	1	
	(ii)	8.1 to 8.5 Must be to 1 decimal place 0.5 to 0.9 Must be to 1 decimal place	1cao 1cao	SC1 for both correct but not to 1dp e.g. 8.27 and 0.73

8	**(a)**	5, 126, 90	1 1, 1	SC1 for both angles incorrect but totalling 216°.
	(b) (i)	3, 5, 6, 4, 2	2	W1 for 3 or 4 correct or left as tallies and all correct.
	(ii)	Blocks 'correct' heights No gaps.	2ft	W1 for only 1 incorrect SC1 All correct but small gaps between or full horizontal lines only
	(c) (i)	10 points plotted correctly	3	W2 for 8 or 9 correct W1 for 6 or 7 correct On vertical age line (±1 mm) and between (or on) correct horizontal lines.
	(ii)	Zero oe	1	(allow weak (slight) negative)
	(iii)	$\frac{3}{20}$ oe or 0.15 or 15%	2ft	Ft numerator only W1 for $\frac{their3}{k}$ $k \geq 3$
9	**(a) (i)**	–8, –13	1cao 1ft	Ft sixth term 5 less than the fifth
	(ii)	Subtract 5 oe	1	
	(iii)	$-5n + 17$	2	W1 for $jn + 17$ or $-5n + k$ where j and k are integers, $j \neq 0$
	(b)	$5n - 8$	2	W1 for $jn - 8$ or $5n - k$ where j and k are integers, $j \neq 0$
	(c)	9 www	1ft	Ft two linear expressions only