

MARK SCHEME for the May/June 2013 series

0581 MATHEMATICS	
0581/31	Paper 3 (Core), maximum raw mark 104

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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 Answers
1	(a) (i) 750	1	
	(ii) 11, 11.5 or 12	1ft	
	(iii) 300	1	
	(iv) 1000	1	
	(b) (i) 13 02	1	
	(ii) 10 26	1	
	(c) (i) 16 24	2	B1 for 1 (h) 36 or 2 (h) 16 or 3 (h) 49 or 96 or 136 or 229 or 4.24(pm) soi.
	(ii) 40 cao	2	M1 for 64 ÷ their time (e.g. 1(h) 36(m))
	(iii) 12 32	1	
2	(a) 29	1	
	(b) 42	1	
	(c) [r =] 66 and [s =] 114	1,1ft	Ft is s = 180 – their r
	(d) 50	1	
	(e) 56	2	M1 for either angle at A or B indicated as 90 soi

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3	(a) (i)	one correct line	1	<p>B1 for either correct line with at most one incorrect</p> <p>B1 for reflection in $x = k$ or $y = 4$</p> <p>B1 for 5 left or 4 down SC for translation of $\begin{pmatrix} -4 \\ -5 \end{pmatrix}$</p> <p>B1 for a correct rotation about the wrong centre</p>		
	(ii)	only two correct lines	2			
	(b)	correct square	1			
	(c) (i)	correct reflection	2			
	(ii)	correct translation	2			
	(iii)	correct rotation	2			
	(d) (i)	rotation centre (0,0) angle 90° [anticlockwise]	1 1 1			
	(ii)	translation $\begin{pmatrix} -6 \\ 3 \end{pmatrix}$	1			
	4	(a) (i)	140 100		1 1	<p>if 0 scored SC1 for their total = 240</p> <p>B1 ft for correct sectors drawn B1 for correct labelling consistent with table</p> <p>M1 for (attempt to add) $\div 12$</p> <p>isw</p>
		(ii)	correct labelled pie chart		2ft	
(b) (i)		40	1			
(ii)		29.5	2			
(iii)		$\frac{7}{12}$ oe	1			
5		(a)	4 points plotted correctly	2	<p>B1 for 3 points plotted correctly</p> <p>Ft from their (c) if ruled and negative gradient</p>	
	(b)	negative	1			
	(c)	correct ruled line	1			
	(d)	22.4 – 22.8	1ft			

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6	(a) (i)	1, 2, 11, 22	2	B1 for just three of these or 3 correct 1 extra or all four and up to 2 extras 1×22 and 2×11	
	(ii)	39	1		
	(b) (i)	2, 17, 19	2		B1 for just two of these or all three and an extra one
	(ii)	1 or 27	1		
	(c) (i)	3.5×10^{-3}	1		M1 for 42 000 oe
	(ii)	4.2×10^4	2		
7	(a)	86.3 or 86.33075.....	2	M1 for $[BC =] \sqrt{27^2 + 82^2}$ or $\sqrt{729 + 6724}$ or $\sqrt{7453}$	
	(b)	090 cao	1		
	(c) (i)	71.8 or 71.77492.....	2	M1 for $\tan [x =] (82 \div 27)$ or better oe	
	(ii)	108.2 or 108	1ft		
	(d) (i)	1107	2	M1 for $27 \times 82 \div 2$ or better, imp by 1110	
	(ii)	9 298 800	1ft		
8	(a)	31 200	2	M1 for $(43\ 680 \div 7) \times 5$ or 6240×5	
	(b)	16 800	3		M2 for $15\ 000 + 15\ 000 \times 0.04 \times 3$ oe or M1 for $15\ 000 \times 0.04 \times 3$ oe, imp by 1800
	(c)	63	2	M1 for $450 \times [0].14$ oe	
	(d) (i)	11 800	2	M1 for $600 + 0.35 \times 32\ 000$ or better	
	(ii)	12 900	2	M1 for $100 + 4 \times 32\ 000 \div 10$ or better	

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9	(a) (i)	2 and 2 12	1 1	all in the correct places
	(ii)	7 points correctly plotted correct curve through the 7points	3ft 1	P2ft for 5 or 6 points correctly plotted P1ft for 3 or 4 points correctly plotted
	(iii)	correct line	1	Must be ruled and continuous
	(iv)	2.6 – 2.8	1ft	ft their curve and their line
	(b) (i)	$\frac{2}{3}$	1	
	(ii)	$y = \frac{2}{3}x + c$	1	c not -5
	(c)	$[y =] 2x - 3$	3	M2 for $y = 2x + p$ or M1 for attempt at gradient i.e. $\frac{\text{rise}}{\text{run}}$ B1 for $y = qx - 3 \quad q \neq 0$
10	(a) (i)	$x + 12$ $x - 34 \quad x - 22$	1,1,1	in each part allow correct unsimplified terms
	(ii)	$x + 12 = 3(x - 22)$ 39 cao	1ft 3	accept $x + 12 = 3x - 66$ or $(x + 12) / 3 = x - 22$ M1 for their $3x - 66$ seen M1 for correctly collecting terms from $ax + b = cx + d \quad a, b, c, d \neq 0$
	(e)	8 -3	3	M1 for correct method to eliminate one variable. A1 for x or y correct.
11	(a)	113 or 113.09 to 113.112	2	M1 for $\pi \times 6^2$ or better
	(b)	185 or 186 or 185.76 or 185.328 to 185.42	4	M1 for their (a) $\times 6$ M1 for 24×36 soi, imp by 864 M1 for their $(24 \times 36) - \text{their (their (a) } \times 6)$ ft their (a) for M3