

**MARK SCHEME for the May/June 2013 series**

**0580 MATHEMATICS**

**0580/31**

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

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

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

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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	<b>P2ft</b> for 5 or 6 points correctly plotted <b>P1ft</b> 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	<b>M2</b> for $y = 2x + p$ or <b>M1</b> for attempt at gradient i.e. $\frac{\text{rise}}{\text{run}}$  <b>B1</b> 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 $(x + 12) / 3 = x - 22$  <b>M1</b> for their $3x - 66$ seen <b>M1</b> for correctly collecting terms from $ax + b = cx + d \quad a, b, c, d \neq 0$
	(e)	8 -3	3	<b>M1</b> for correct method to eliminate one variable. <b>A1</b> for $x$ or $y$ correct.
11	(a)	113 or 113.09 to 113.112	2	<b>M1</b> for $\pi \times 6^2$ or better
	(b)	185 or 186 or 185.76 or 185.328 to 185.42	4	<b>M1</b> for their (a) $\times 6$ <b>M1</b> for $24 \times 36$ soi, imp by 864 <b>M1</b> for their $(24 \times 36) - \text{their (their (a) } \times 6)$ ft their (a) for <b>M3</b>