

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International General Certificate of Secondary Education

**MARK SCHEME for the May/June 2015 series****0580 MATHEMATICS****0580/31**

Paper 3 (Core), maximum raw mark 104

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**Abbreviations**

cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfw	not from wrong working
soi	seen or implied

<b>Question</b>	<b>Answer</b>	<b>Mark</b>	<b>Part marks</b>		
<b>1</b>	<b>(a) (i)</b> At least two of 1, 2, 3, 4, 6, 12	<b>1</b>	No incorrect factors  Accept any $75k, k > 0$		
	<b>(ii)</b> 23	<b>1</b>			
	<b>(iii)</b> 4	<b>1</b>			
	<b>(iv)</b> 2 000 507	<b>1</b>			
	<b>(v)</b> e.g. 75, 150	<b>1</b>			
	<b>(vi)</b> 3.1416	<b>1</b>			
	<b>(b) (i)</b> 163	<b>1</b>			
	<b>(ii)</b> 7.5	<b>1</b>			
	<b>(c) (i)</b> 63521.8	<b>1</b>			
	<b>(ii)</b> 63500 cao	<b>1</b>			
	<b>(d) (i)</b> [0].234	<b>1</b>			
	<b>(ii)</b> 8 760 000	<b>1</b>			
	<b>2</b>	<b>(a) (i)</b> rotation [centre] (0, 0) oe 90° clockwise oe		<b>1</b> <b>1</b> <b>1</b>	
		<b>(ii)</b> reflection $y$ -axis or $x = 0$		<b>1</b> <b>1</b>	
<b>(iii)</b> translation		<b>1</b>			
$\begin{pmatrix} 8 \\ 5 \end{pmatrix}$		<b>1</b>			
<b>(b)</b> correct enlargement shown		<b>2</b>			
			<b>B1</b> for enlargement of sf 2 anywhere on the grid		

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Question	Answer	Mark	Part marks	
3	(a) (i) 6	1		
	(ii) 0.21	2	M1 for $\frac{220}{38}$ or better	
	(b) (i) 5, 15, 20	2	B1 for 1 correct answer in the right place or M1 for $40 \div (1 + 3 + 4) [\times k]$ soi where $k$ is 1 or 3 or 4	
	(ii) 2 : 3 : 5	2	M1 for (16,24,40) or better or M1FT for 'their (5,15,20)' + (11,9,20) or better	
	(c) (i) 570	1		
	(ii) $b + 2t = 240$	2	B1 for $b + 2t$ seen	
	(iii) [b] 90 [t] 75 Working must be shown	3	M1FT for correct elimination of one variable A1 for $b = 90$ A1 for $t = 75$ If zero is scored SC1 for 2 values satisfying one of their equations (ft) SC1 if no working shown, but 2 correct answers given	
	(d) 16.83	3	B1 for 340 or 0.2 or 5 seen M1 for figs $340 \div$ figs $20 \times$ figs 99 or figs $340 \times$ figs $5 \times$ figs 99	
	4	(a) (i) 292	1	
		(ii) 380	2	B1 for $(9.5 \pm 0.2)$ If zero scored, SC1 for figs '372 to 388'
(iii) 125		2	M1 for $\frac{450 \times 1000}{60 \times 60}$ or better	
(b) (i) 0.85		1		
(ii) 36		1		
(c) (i) 6		1		
(ii) 16		1		
(iii) 17		1		
(iv) 17.5		2	M1 for $(15+16+16+18+19+21) \div 6$	

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Question	Answer	Mark	Part marks
(v)	$\frac{2}{6}$ oe	1	
(d) (i)	2.62	2	<b>M1</b> for $3.25 \div 1.24$
(ii)	245, 255	2	<b>B1</b> for one correct or both correct but reversed
5 (a)	green	1	
(b)	72	3	<b>B1</b> for $135^\circ \pm 2^\circ$ seen  <b>M1</b> for $\frac{360 \times 27}{their\ 135}$ oe
(c)	22.2	2	<b>M1</b> for $\frac{80 \pm 2}{360} \times 100$ or <b>M1FT</b> for $\frac{their\ red}{their\ total} \times 100$
6 (a) (i)	2	1	
(ii)	0	1	
(iii)	360	1	
(b) (i)	correct bisector drawn with 2 pairs of correct arcs reaching <i>DC</i>	2	<b>B1</b> for correct bisector without arcs reaching <i>DC</i> or correct bisector with 2 pairs of arcs not reaching <i>DC</i>
(ii)	alternate [angles]	1	
(iii)	isosceles	1	
	[angle] <i>DAE</i> = [angle] <i>DEA</i> oe	1	
(iv)	trapezium	1	

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Question	Answer	Mark	Part marks
7	(a) (i) Brookland to Cawley and [gradient is] steeper oe	1	
	(ii) 100	2	<b>M1</b> for $\frac{35}{10}$ oe
	(b) (i) correct graph	2	<b>B1</b> for horizontal line (0940, Cawley) to (0950, Cawley)  <b>B1FT</b> for line ( <i>their</i> 0950, Cawley) to ( <i>their</i> 0950 + 30, Audley)
	(ii) 10 20	1FT	
	(c) 1400	2	<b>B1</b> for 300 or 5 h or 2:00 or 2 o'clock or any 2 of 10:40, 12:20(FT) or 14:00(FT)/2:00(FT)  If zero scored, <b>SC1</b> for 1540 or 3:40pm
8	(a) 153	2	<b>M1</b> for $90 + 63$ or $180 - (90 + 63)$ oe or [angle $BCA =$ ]27
	two correct geometrical reasons	2	<b>B1</b> for angle [in] semi-circle [is 90] <b>B1</b> for angles [in a] triangle [sum to] 180 or angles [on a] straight line [sum to] 180
	(b) 14.8 or 14.79 to 14.80	5	<b>M2</b> for $\frac{3}{4} \times \pi \times 3^2$ or <b>M1</b> for $\pi \times 3^2$  <b>M1</b> for $6 \times 6$ or 36  <b>M1 dep</b> for <i>their</i> $6 \times 6 - \text{their } k \times \pi \times 3^2$
	(c) (i) 36	3	<b>M2</b> for $\sqrt{45^2 - 27^2}$ or better or <b>M1</b> for $45^2 = GH^2 + 27^2$ or better
	(ii) 108	1FT	
	(iii) 486	2FT	<b>M1FT</b> for $0.5 \times 27 \times \text{their (c)(i)}$

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<b>Question</b>	<b>Answer</b>	<b>Mark</b>	<b>Part marks</b>
<b>9</b>	<b>(a) (i)</b> 0, 6, 6, –6	<b>2</b>	<b>B1</b> for any 3 correct
	<b>(ii)</b> 8 points correctly plotted correct smooth curve	<b>4</b>	<b>B3FT</b> for 7 or 8 correct <b>B2FT</b> for 5 or 6 correct <b>B1FT</b> for 3 or 4 correct
	<b>(b)</b> (2.5, $k$ ) where $6 < k \leq 6.5$	<b>1</b>	
	<b>(c)</b> 5.4 to 5.7 –0.4 to –0.7	<b>1FT</b> <b>1FT</b>	
	<b>(d) (i)</b> correct line drawn	<b>1</b>	
	<b>(ii)</b> $x = 2.5$	<b>1</b>	
	<b>(iii)</b> 15	<b>1</b>	