

**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

Question	Answer	Mark	Part marks
<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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<b>Question</b>	<b>Answer</b>	<b>Mark</b>	<b>Part marks</b>	
<b>3</b>	<b>(a) (i)</b> 6	<b>1</b>		
	<b>(ii)</b> 0.21	<b>2</b>	<b>M1</b> for $\frac{220}{38}$ or better	
	<b>(b) (i)</b> 5, 15, 20	<b>2</b>	<b>B1</b> for 1 correct answer in the right place or <b>M1</b> for $40 \div (1 + 3 + 4) [\times k]$ soi where $k$ is 1 or 3 or 4	
	<b>(ii)</b> 2 : 3 : 5	<b>2</b>	<b>M1</b> for (16,24,40) or better or <b>M1FT</b> for ‘their (5,15,20)’ + (11,9,20) or better	
	<b>(c) (i)</b> 570	<b>1</b>		
	<b>(ii)</b> $b + 2t = 240$	<b>2</b>	<b>B1</b> for $b + 2t$ seen	
	<b>(iii)</b> [b] 90 [t] 75 Working must be shown	<b>3</b>	<b>M1FT</b> for correct elimination of one variable <b>A1</b> for $b = 90$ <b>A1</b> for $t = 75$ If zero is scored <b>SC1</b> for 2 values satisfying one of their equations (ft) <b>SC1</b> if no working shown, but 2 correct answers given	
	<b>(d)</b> 16.83	<b>3</b>	<b>B1</b> for 340 or 0.2 or 5 seen <b>M1</b> for figs $340 \div$ figs $20 \times$ figs 99 or figs $340 \times$ figs $5 \times$ figs 99	
	<b>4</b>	<b>(a) (i)</b> 292	<b>1</b>	
		<b>(ii)</b> 380	<b>2</b>	<b>B1</b> for $(9.5 \pm 0.2)$ If zero scored, <b>SC1</b> for figs ‘372 to 388’
<b>(iii)</b> 125		<b>2</b>	<b>M1</b> for $\frac{450 \times 1000}{60 \times 60}$ or better	
<b>(b) (i)</b> 0.85		<b>1</b>		
<b>(ii)</b> 36		<b>1</b>		
<b>(c) (i)</b> 6		<b>1</b>		
<b>(ii)</b> 16		<b>1</b>		
<b>(iii)</b> 17		<b>1</b>		
<b>(iv)</b> 17.5		<b>2</b>	<b>M1</b> 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 $\frac{35-10}{\text{time}}$ 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>	