

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

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.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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

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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 ' <i>their</i> (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 ± 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	M1 for $3.25 \div 1.24$
(ii)	245, 255	2	B1 for one correct or both correct but reversed
5 (a)	green	1	
(b)	72	3	B1 for $135^\circ \pm 2^\circ$ seen M1 for $\frac{360 \times 27}{\text{their } 135}$ oe
(c)	22.2	2	M1 for $\frac{80 \pm 2}{360} \times 100$ or M1FT for $\frac{\text{their red}}{\text{their total}} \times 100$
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	B1 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	M1 for $\frac{35-10}{\text{time}}$ oe
(b) (i)	correct graph	2	B1 for horizontal line (0940, Cawley) to (0950, Cawley) B1FT for line (<i>their</i> 0950, Cawley) to (<i>their</i> 0950 + 30, Audley)
(ii)	10 20	1FT	
(c)	1400	2	B1 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, SC1 for 1540 or 3:40pm
8	(a) 153	2	M1 for $90 + 63$ or $180 - (90 + 63)$ oe or [angle $BCA =$]27
	two correct geometrical reasons	2	B1 for angle [in] semi-circle [is 90] B1 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	M2 for $\frac{3}{4} \times \pi \times 3^2$ or M1 for $\pi \times 3^2$ M1 for 6×6 or 36 M1 dep for <i>their</i> $6 \times 6 - \text{their } k \times \pi \times 3^2$
(c) (i)	36	3	M2 for $\sqrt{45^2 - 27^2}$ or better or M1 for $45^2 = GH^2 + 27^2$ or better
(ii)	108	1FT	
(iii)	486	2FT	M1FT for $0.5 \times 27 \times \text{their (c)(i)}$

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