

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International General Certificate of Secondary Education

**MARK SCHEME for the May/June 2015 series**

**0444 MATHEMATICS (US)**

**0444/31**

Paper 3, 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
nfww	not from wrong working
soi	seen or implied

	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
	<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>	Accept any $75k, k > 0$
	<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> 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

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	(iii)	[b] 90 [t] 75 Working must be shown	3	<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
	(d)	16.83	3	<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
3	(a) (i)	292	1	
	(ii)	380	2	
	(iii)	125	2	
	(b) (i)	0.85	1	
	(ii)	36	1	
	(c) (i)	6	1	
	(ii)	16	1	
	(iii)	17	1	
	(iv)	17.5	2	
	(v)	$\frac{2}{6}$ oe	1	
	(d)	2.62	2	<b>M1</b> for $3.25 \div 1.24$
4	(a) (i)	rotation [centre] (0, 0) oe 90° clockwise oe	1 1 1	
	(ii)	reflection $y$ axis or $x = 0$	1 1	
	(iii)	translation $\begin{pmatrix} -8 \\ -5 \end{pmatrix}$	1 1	
	(b)	correct enlargement shown	2	
				<b>B1</b> for enlargement of sf 2 anywhere on the grid
5	(a) (i)	2	1	
	(ii)	0	1	

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	(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 or correct bisector with 2 pairs of arcs not reaching <i>DC</i>
	(ii)	alternate [angles]	1	
	(iii)	isosceles [angle] <i>DAE</i> = [angle] <i>DEA</i> oe	1 1	
	(iv)	trapezoid or trapezium	1	
6	(a) (i)	$(0, 1\frac{1}{2})$	2	<b>B1</b> for each co-ordinate
	(ii)	$\begin{pmatrix} 6 \\ -7 \end{pmatrix}$	1	
	(iii)	(2, 3)	1	
	(b) (i)	Ruled straight line parallel to <i>f(x)</i> through (0, 1)	2	<b>B1</b> for ruled straight line parallel to <i>f(x)</i>
	(ii)	Correct horizontal translation through (0, 0) and (1, 0)	2	<b>B1</b> for any horizontal translation
7	(a)	153	2	<b>M1</b> for $90 + 63$ or $180 - (90 + 63)$ oe or [angle <i>BCA</i> =]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>M1dep</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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	(iv)	36.9 or 36.86 to 36.87	2	M1 for $\sin(\dots) = \frac{27}{45}$ or $\cos(\dots) = \frac{\text{their}}{45}$ $\tan(\dots) = \frac{27}{\text{their(c)(i)}}$ or better
8	(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	
9	(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 $\frac{\text{their red}}{\text{their total}} \times 100$