



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

MATHEMATICS

0580/32

Paper 3 (Core)

October/November 2016

MARK SCHEME

Maximum Mark: 104

Published

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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

Question	Answer	Mark	Part marks	
1	(a) (i)	12	1	
	(ii)		1	
	(iii)	Fantasy	1	
	(iv)	$\frac{4}{50}$ oe isw	1	
	(b) (i)	3	2	M1 for 25th and 26th value or list of at least first or last 26 values
	(ii)	3.1 nfww	3	M1 for $7 \times 1 + 2 \times 14 + 3 \times 12 + 4 \times 5 + 5 \times 8 + 6 \times 4$ or better M1 dep for <i>their</i> $155 \div 50$
	(c) (i)	$\frac{90}{360}$ oe	1	
	(ii)	125	3	B1 150 soi M1 for $\frac{their150}{360} \times 300$ oe
2	(a) (i)	Octagon	1	
	(ii)	2	1	
	(iii)	Correct enlargement	2	B1 for enlargement with incorrect scale factor (sf $\neq 1$) or B1 for any four sides correct
	(b) (i)	Rotation 90° clockwise oe [Centre] (0, 0) oe	B1 B1 B1	
	(ii)	Correct reflection Vertices (-2, -1), (-2, -2), (-5, -2)	1	

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Question	Answer	Mark	Part marks
(iii)	Correct translation Vertices $(4, -2)$, $(5, -2)$, $(5, 1)$	2	B1 for translation $\begin{pmatrix} 3 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ -4 \end{pmatrix}$
3 (a)	2 <i>B</i> and 1 <i>A</i> selected, with at least one other combination and its value seen or 2 <i>B</i> and 1 <i>A</i> selected, with 0.625 and 0.64 seen 3.15 selected	2 1	M1 for one correct cost for 5 litres or B1 for 0.625 or 0.64 Independent
(b)	2	2	M1 for $[1.5 +] \frac{1}{3} \times 1.5$ oe soi by 0.5
(c) (i)	5 : 2 : 10	2	M1 for 500 : 200 : 1000 oe
(ii)	6.8	3	B2 for answer 6800 or M2 for $\frac{2}{5} \times 17$ oe or for $4 \times (0.5 + 0.2 + 1)$ or for $4 \times (500 + 200 + 1000)$ oe or M1 for $\frac{5}{17}$ soi or for $\frac{2000}{500}$ oe soi by 4
(d)	7.79 or 7.80 or 7.794 to 7.795	2	M1 for $300 = \pi \times 3.5^2 \times h$ or better implied by $\frac{300}{(38.4 \text{ to } 38.5)}$
(e)	755 745	2	B1 for one correct or both values reversed
4 (a)	9, -3, -3	2	B1 for 9 or -3 and -3
(b)	Correct curve	4	B3FT for 6 or 7 correctly plotted points or B2FT for 4 or 5 correctly plotted points or B1FT for 2 or 3 correctly plotted points
(c)	$x = 2.5$	1	
(d) (i)	(4, 0)	1	
(ii)	(0, 4)	1	

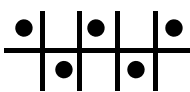
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Question	Answer	Mark	Part marks
(e)	Ruled line through (4, 0) and (0, 4)	1	
(f)	(4.1 to 4.3, -0.1 to -0.5) (-0.1 to -0.3, 4.1 to 4.5)	2FT	B1FT for one correct or both x -values correct or both y -values correct
5 (a) (i)	40 to 42	2	M1 for 8.0 to 8.4 or 80 to 84 seen
(ii)	104 to 108	1	
(iii)	D marked correctly	2	B1 for bearing 215° B1 for distance 6 cm
(iv)	P marked correctly with arcs	3	B1 for arc centre C radius 5 cm B1 for two correct pairs of intersecting arcs (for perpendicular bisector of AB) B1 P marked in correct position
(b) (i)	05 45 [0]6 15 [0]7 30 [0]6 20 06 50 08 05	3	B1 for each
(ii)	42.9 or 42.85 to 42.86	2	M1 for $\frac{25}{35}$ or $\frac{25}{0.583\dots}$ or $\frac{25}{35} \times 60$ oe
6 (a)	4 or 1	2	B1 for 2 or 3 or 6 or 8 or 12 or 24 or 2^2 or 1^2
(b)	125	1	
(c) (i)	3.5 or $3\frac{1}{2}$	1	
(ii)	4913	1	
(iii)	0.0625 or $\frac{1}{16}$	1	
(d)	6.174	2	M1 for $\frac{1}{2} \times 0.7 \times 4.2^2$ soi by 6.17
(e) (i)	1	1	
(ii)	b^5	1	
(iii)	c^{-4} or $\frac{1}{c^4}$	1	

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Question	Answer	Mark	Part marks
7	(a) (i)	122	1
	(ii)	625.86 cao	3
	(b)	Mei 9.61 cao	3
(c)	554.36	3	<p>M2 for $15.25 \times 1.08 \times 38$ oe soi by 626 or 625.9</p> <p>or M1 for 15.25×1.08 soi by 16.47</p> <p>or for 15.25×38 soi by 579.5</p> <p>If zero scored, SC1 for 131.76 or 5006.88</p> <p>M1 for 425×1.45</p> <p>M1FT for $\pm(\text{their } 625.86 - \text{their } 616.25)$</p> <p>If zero scored, SC1 for [€] 6.62 to 6.63</p> <p>M2 for 500×1.035^3 oe</p> <p>or</p> <p>M1 for 500×1.035^k, $k \neq 1, 3$</p> <p>If zero scored, SC1 for answer of 54.36 or 54.35 or 54.4 or 54.358... 54.359</p>
8	(a) (i)	Tangent	1
	(ii)	Chord	1
	(b) (i)	Angle [in] semicircle	1
	(ii)	20	2
	(iii)	$[AB =] \sqrt{8^2 + 5^2} = 9.433\dots$ or 9.434	M2
	(iv)	69.8 or 69.9 or 69.84 to 69.91	2
	(v)	71.3 to 71.4	2
			<p>M1 for $\frac{1}{2} \times 8 \times 5$</p> <p>M1 for $[AB^2 =] 8^2 + 5^2$</p> <p>M1 for $\pi \times \left(\frac{9.43}{2}\right)^2$ or $\pi \times (4.72)^2$</p> <p>M1 for $\frac{\text{their } \mathbf{b(iv)} - \text{their } \mathbf{b(ii)}}{\text{their } \mathbf{b(iv)}} [\times 100]$</p> <p>or $\left(1 - \frac{\text{their } \mathbf{b(ii)}}{\text{their } \mathbf{b(iv)}}\right) [\times 100]$</p> <p>or $[100 -] \frac{\text{their } \mathbf{b(ii)}}{\text{their } \mathbf{b(iv)}} \times 100$</p>

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Question	Answer	Mark	Part marks
9 (a)		1	
(b)	$\begin{array}{ccc} 4 & 5 & 11 \\ 10 & 13 & 31 \end{array}$	4	B1 for 11 B1 for 31 B2 for 4, 5, 10, 13 or B1 for two of 4, 5, 10, 13
(c) (i)	$n + 1$ oe final answer	1	
(ii)	$3n + 1$ oe final answer	2	B1 for $3n + k$ or $cn + 1$ $c \neq 0$
(d)	26	2	M1FT for <i>their</i> c(ii) = 76 or better or M1 implied by answer of 25