



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

MATHEMATICS

0580/33

Paper 3 (Core)

May/June 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
nfw	not from wrong working
soi	seen or implied

Question	Answer	Mark	Part marks
1 (a) (i)	$11 \div (11 + 14 + 5) \times 18$	1	
(ii)	[paths] 8.4 [buildings] 3[.0]	1 1	
(b)	[Mammals] 4.2 [Reptiles] 1.98	1 1	
(c) (i)	7 [h] 45 [min]	1	
(ii)	55 [h] 45 [min]	2FT	B1 for 55.75 seen or 38 [h] 45 [min] or 17 [h] soi or M1FT for $5 \times \text{their (c)(i)} + 2 \times 8 \text{ [h] } 30 \text{ [min]}$ or better
(d) (i)	[\$] 48[.00]	2	M1 for $2 \times 11 + 2 \times 9.25 + 7.50$ or better If M0 then SC1 for 55.50
(ii)	12.5	3FT	M2 for $\frac{\text{their}(d)(i) - 42}{\text{their}(d)(i)} [\times 100]$ or $\left(100 - \left(\frac{42}{\text{their}(d)(i)} \times 100 \right) \right)$ or M1 for $\frac{42}{\text{their}(d)(i)}$ or figs 875 or B1 for $\text{their (d)(i)} - 42$ or <i>their 6</i> seen
2 (a) (i)	10	2	M1 for $360 \div 36$
(ii)	144	1	
(iii)	1440	1FT	$\text{their (a)(i)} \times \text{their (a)(ii)}$

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Question	Answer	Mark	Part marks
(b) (i)	5.5 or $5\frac{1}{2}$	1	
(ii)	Translation	1	
	$\begin{pmatrix} -3 \\ -8 \end{pmatrix}$	1	
(iii) (a)	Correct reflection	2	B1 for reflection in $x = k$ or reflection in $y = 2$
(iii) (b)	Correct enlargement	2	B1 for correct scale factor and orientation but incorrect centre
3 (a) (i)	754 or 753.9 to 754.1	2	M1 for $\pi \times 4^2 \times 15$ or better
	cm ³ or cubic centimetres	1	Independent mark
(ii)	427 or 427.2 to 427.312	2	M1 for $2 \times \pi \times 4 \times 15 + \pi \times 4^2$ or better
(b)	$\frac{A - \pi r^2}{2\pi r}$ oe final answer	2	B1 for $A - \pi r^2 = 2\pi r h$ or better or $\frac{A}{2\pi r} = h + \frac{\pi r^2}{2\pi r}$ or better
(c)	$\pi r(2h + r)$ final answer	2	B1 for $\pi(2rh + r^2)$ or $r(2\pi h + \pi r)$
(d) (i)	2 : 3	1	
	2 : 3	1	Accept 1 : 1.5 or $\frac{2}{3} : 1$
(ii)	Similar	1	
4 (a)	5 bars correct heights and equal widths	2	B1 for 4 bars correct height and equal widths or 5 bars of correct height
(b)	2010	1	
(c) (i)	2180	1	
(ii)	2040	2	B1 for ordering at least 4 or identifying the middle two
(iii)	1970	2	M1 for $(920 + 1070 + 3100 + 2240 + 2650 + 1840) \div 6$ or $11820 \div 6$

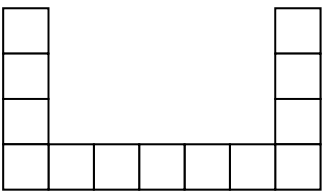
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Question	Answer	Mark	Part marks
5 (a) (i)	-4 -16 8 1	2	B1 for 3 correct
(ii)	Completely correct curve	4	B3FT for 9 or 10 correctly plotted B2FT for 7 or 8 correctly plotted B1FT for 5 or 6 correctly plotted
(b)	2	1	
(c) (i)	Ruled line $y = x$ drawn	1	Must at least intersect the graph in two places
(ii)	$y = x$ oe	1	
(d)	Continuous ruled line $y = 7$ drawn	1	Must intersect the graph
	2.1 to 2.5	1FT	
6 (a) (i)	57	1	
(ii)	48	1	
(iii)	50	1	
(iv)	53	1	
(v)	63	1	
(vi)	64	1	
(vii)	49	1	
(viii)	Any three from 41 43 47 53 59 61 67	2	B1 for 2 correct and at most one error
(b)	$2 \times 3^2 \times 13$ or $2 \times 3 \times 3 \times 13$	2	B1 for 2, 3 and 13 only identified as factors or for a correct product eg $2 \times 9 \times 13$, 18×13
(c) (i)	3^{11}	1	
(ii)	177 147	1	
(iii)	$1.77[147] \times 10^5$	1FT	follow through <i>their</i> (c)(ii)
(d) (i)	$\frac{1}{9}$	1	
(ii)	3	1	

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Question	Answer	Mark	Part marks
7 (a)	48 to 52	1	
(b) (i)	Correct ruled angle bisector with 2 pairs of correct arcs	2	B1 for accurate with no / one pair of arcs or M1 for 2 pairs of correct arcs with no / wrong line
(ii)	270 to 278	2FT	B1 for 13.5 ± 0.2 [cm] seen in working or B1FT for <i>their</i> line from $E \pm 0.2$ cm to outside
(iii)(a)	$9 \times 1000 \div (60 \times 60)$	1	
(iii)(b)	108 to 111.2	2FT	M1FT for <i>their</i> (b)(ii) $\div 2.5$
(c)	Correct ruled perpendicular bisector of DE with 2 pairs of arcs	2	B1 for accurate with no / one pair of arcs or M1 for correct intersecting arcs with no / wrong line
(d) (i)	Arc centre A , radius 7.5 from AB to AE	2	B1 for centre A , incorrect radius or correct arc too short
(ii)	Correct region shaded	1FT	follow through provided an area is possible
8 (a)	Isosceles	1	
(b) (i)	73	1	
(ii)	15	1FT	FT is $180 - (73 + 19 + \text{their (b)(i)})$
(iii)	90	1	
(iv)	19	1	
(v)	71	2	M1 for [angle $CAF =$] $90 - 19$ or B1 for angle $CAF = 90^\circ$ soi
(c)	40.8 cao	3	B2 for 40.84..... or M1 for 13π oe seen in the working B1 independent for rounding their circumference correctly if to more than 1 d p

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Question	Answer	Mark	Part marks
9 (a)	Cube	1	
(b) (i)		1	
(ii)	13	1	
	17	1	If 0 scored SC1 for second number 4 more than the first
(iii)	$4n - 3$ oe final answer	2	B1 for $4n - j$ or $kn - 3$ ($k \neq 0$)
(iv)	73	1FT	follow through linear expressions in (b)(iii)
(v)(a)	25	2	B1FT for <i>their</i> (b)(iii) = 98 or B1 for 25.25
(v)(b)	1	1FT	follow through <i>their</i> (b)(v)(a) if an integer