Cambridge International Examinations
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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
nfww not from wrong working
soi seen or implied

Question	Answer	Mark	Part marks
1 (a) (i)	11 ÷ (11 + 14 + 5) × 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 × *their* (c)(i) + 2 × 8 [h] 30 [min] or better
(d) (i)	[$] 48[.00]	**2**	**M1** for 2 × 11 + 2 × 9.25 + 7.50 or better If M0 then **SC1** for 55.50
(ii)	12.5	**3FT**	**M2** for $\frac{their(d)(i)-42}{their(d)(i)}$[×100] or $\left(100-(\frac{42}{their(d)(i)}\times 100)\right)$ or **M1** for $\frac{42}{their(d)(i)}$ or figs 875 or **B1** for *their (d)(i)* – 42 or *their* 6 seen
2 (a) (i)	10	**2**	**M1** for 360 ÷ 36
(ii)	144	**1**	
(iii)	1440	**1FT**	*their* (a)(i) × *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 $A - \pi r^2 = 2\pi rh$ 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) ÷ 6 or 11820 ÷ 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 *their* (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 *their* line from *E* ± 0.2cm to outside
(iii)(a)	9 × 1000 ÷ (60 × 60)	1	
(iii)(b)	108 to 111.2	2FT	**M1**FT for *their* (b)(ii) ÷ 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 + *their* (b)(i))
(iii)	90	1	
(iv)	19	1	
(v)	71	2	**M1** for [angle *CAF* =] 90 – 19 or **B1** for angle *CAF* = 90° 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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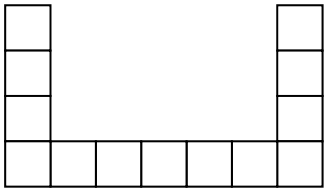
Question	Answer	Mark	Part marks
9 (a)	Cube	1	
(b) (i)		1	
(ii)	13	1	
	17	1	If 0 scored **SC1** for second number 4 more than the first
(iii)	$4n - 3$ oe final answer	2	**B1** for $4n - j$ or $kn - 3$ ($k \neq 0$)
(iv)	73	1FT	follow through linear expressions in (b)(iii)
(v)(a)	25	2	**B1FT** for *their* (b)(iii) = 98 or **B1** for 25.25
(v)(b)	1	1FT	follow through *their* (b)(v)(a) if an integer

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