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**MATHEMATICS**

**0580/33**

Paper 3 (Core)

**October/November 2017**

MARK SCHEME

Maximum Mark: 104

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**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	Marks	Partial marks
1(a)(i)	800	1	
1(a)(ii)	48	2	<b>M1</b> for $\frac{160}{2+5+3} [\times 3]$
1(a)(iii)	60	1	
1(b)(i)	43.5[0]	2	<b>M1</b> for $3 \times 7.5[0] + 2 \times 10.5[0]$
1(b)(ii)	7.6[0]	2	<b>M1</b> for $9.5 \left(1 - \frac{20}{100}\right)$ oe
1(c)(i)	102 138	2	<b>M1</b> for $\frac{85}{300} \times 360$ or $\frac{115}{300} \times 360$ or $\frac{120}{100} \times 85$ or $\frac{120}{100} \times 115$ oe
1(c)(ii)	3 correct sectors	<b>2FT</b>	<b>FT</b> if <i>their</i> angles add to 240° <b>B1FT</b> for one correct sector
1(d)	40	3	<b>M2</b> for $\frac{31.50 - 22.50}{22.50} \times 100$ or $\left(\frac{31.50}{22.50} - 1\right) \times 100$ oe or <b>M1</b> for $\frac{31.50 - 22.50}{22.50}$ or $\frac{31.50}{22.50} - 1$ or $\frac{31.50}{22.50} \times 100$ oe
2(a)(i)	9	1	
2(a)(ii)	4	1	
2(b)(i)	1.4	1	
2(b)(ii)	4096	1	
2(c)	[0].043 cao	2	<b>M1</b> for 0.0426... or $\frac{367}{8610}$

Question	Answer	Marks	Partial marks
2(d)	64.8	2	<b>M1</b> for $\frac{1}{3} \times 4.5^2 \times 9.6$ or $\frac{324}{5}$
2(e)	$\sqrt{5}$ indicated	1	
2(f)(i)	300	1	
2(f)(ii)	$2^4 \times 5$ or $2 \times 2 \times 2 \times 2 \times 5$	2	<b>M1</b> for 2, 2, 2, 2, 5 or $2^4, 5$ or $1 \times 2 \times 2 \times 2 \times 2 \times 5$ or $1 \times 2^4 \times 5$
2(f)(iii)	20	2	<b>B1</b> for 2 or 4 or 5 or 10 as answer or $2^2 \times 5$ as answer
3(a)(i)	Chord	1	
3(a)(ii)	Tangent	1	
3(b)(i)	48	1	
3(b)(ii)	66	2	<b>M1</b> for $180 - 48$ soi by 132
3(b)(iii)	42	<b>2FT</b>	<b>2FT</b> for $90 - \text{their (b)(i)}$ or <b>B1</b> for angle $OCQ = 90$ soi
4(a)	Scalene	1	
4(b)	Translation	1	
	$\begin{pmatrix} -5 \\ -4 \end{pmatrix}$	1	
4(c)	Correct rotation Vertices (2, -1), (2, -4), (3, -2)	2	<b>B1</b> for correct orientation but wrong position or for rotation of $90^\circ$ anticlockwise about origin
4(d)(i)	1.5 oe	1	
4(d)(ii)	Correct enlargement Vertices (1, 3), (3, 5), (7, 3)	2	<b>B1</b> for correct size and orientation, incorrect position
4(d)(iii)	4	2	<b>M1</b> for $\frac{1}{2} \times 6 \times 2$ soi by 6 or correct method to find area of <i>their</i> triangle

Question	Answer	Marks	Partial marks
5(a)(i)	$n + 10$	<b>1</b>	
5(a)(ii)	$2(n + 10)$ oe isw	<b>1FT</b>	
5(a)(iii)	<i>their (ii)</i> = 52	<b>M1</b>	
	16 final answer	<b>B2</b>	<b>M1</b> for $2n = 52 - 20$ or $n = 26 - 10$ or better
5(a)(iv)	42	<b>1FT</b>	<b>FT</b> $2 \times \textit{their (iii)} + 10$
5(b)(i)	$\frac{1}{4}$ cao	<b>2</b>	<b>B1</b> for $\frac{13}{52}$ oe soi
5(b)(ii)	Correct arrow at $\frac{3}{4}$	<b>1</b>	
5(c)	2.7[00]	<b>2</b>	<b>B1</b> for answer figs 27 or for 0.45 seen
5(d)	115 125	<b>2</b>	<b>B1</b> for one correct or both values correct but reversed
6(a)(i)	4.5	<b>2</b>	<b>M1</b> for ordered list of at least 6 values or <b>B1</b> for 4.3 <b>and</b> 4.7 both identified
6(a)(ii)	8	<b>1</b>	
6(a)(iii)	5.18	<b>2</b>	<b>M1</b> for sum of 10 distances $\div 10$
6(b)(i)	15 50 or 3.50 pm	<b>2</b>	<b>M1</b> for $9 \div 6$ or 1.5 hours oe seen
6(b)(ii)	100	<b>2</b>	<b>M1</b> for $6 \times 1000$ or $6 \div 60$ soi
6(c)(i)	Positive	<b>1</b>	
6(c)(ii)	Point (4, 68) indicated	<b>1</b>	
7(a)(i)	-3 -6 6 3	<b>2</b>	<b>B1</b> for 2 or 3 values correct
7(a)(ii)	Correct curve	<b>4</b>	<b>B3FT</b> for 7 or 8 correctly plotted points or <b>B2FT</b> for 5 or 6 correctly plotted points or <b>B1FT</b> for 3 or 4 correctly plotted points
7(a)(iii)	Ruled line $y = -5$	<b>1</b>	
7(a)(iv)	-2.5 to -2.3	<b>1FT</b>	<b>FT</b> intersection of <i>their</i> line with <i>their</i> curve

Question	Answer	Marks	Partial marks
7(b)(i)	$-0.5$ oe	2	<b>M1</b> for $\frac{\text{rise}}{\text{run}}$
7(b)(ii)	$y = -0.5x + 2$ oe	1FT	<b>FT</b> their gradient
7(b)(iii)	$y = -0.5x + 3$ oe	2FT	<b>B1FT</b> for $y = -0.5x + k$ oe, $k \neq 2$ or <b>B1</b> for $y = mx + 3$ oe, $m \neq -0.5$ or 0
8(a)(i)	Correct trapezium	2	<b>M1</b> for $AB = 8$ cm and $BC = 6$ cm or $AB$ and $DC$ perpendicular to $AD$
8(a)(ii)	124	1FT	<b>FT</b> their obtuse angle at $C$ (or $B$ )
8(a)(iii)	4.7	1FT	<b>FT</b> their $CD$
8(a)(iv)	31.25 to 32.25	2	<b>M1</b> for $0.5 \times 5 \times (8 + \text{their (iii)})$ oe
8(b)(i)	17700 or 17671 to 17674	3	<b>M2</b> for $\pi \times 15^2 \times 25$ or <b>B1</b> for 15 seen If zero scored, <b>SC1</b> for answer 70700 or 70685 to 70695 or $22500\pi$
8(b)(ii)	4800	3	<b>M2</b> for $2 \times 30 \times 30 + 4 \times 30 \times 25$ oe or better or <b>M1</b> for $30 \times 30$ and $30 \times 25$ or <b>B1</b> for cuboid 30 by 30 by 25 soi
9(a)	$y(y + 8)$ final answer	1	
9(b)	$2x + 17$ final answer	2	<b>B1</b> for $6x - 3$ or $-4x + 20$ or $2x + j$ or $kx + 17$ as final answer
9(c)	$\frac{k - 5m}{7}$ oe final answer	2	<b>M1</b> for $7p = k - 5m$ or $\frac{k}{7} = \frac{5m}{7} + p$
9(d)	Correctly equating one set of coefficients	<b>M1</b>	
	Correct method to eliminate one variable	<b>M1</b>	Dependent on the coefficients being the same for one of the variables. Correct consistent use of addition or subtraction using their equations.
	$x = 4$	<b>A1</b>	
	$y = -3$	<b>A1</b>	If zero scored, <b>SC1</b> if no working shown, but 2 correct answers given or <b>SC1</b> for 2 values satisfying one of the original equations.