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**MATHEMATICS**

**0580/33**

Paper 3 (Core)

**May/June 2017**

MARK SCHEME

Maximum Mark: 104

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**Published**

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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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	Part marks
1(a)	40	2	<b>M1</b> for $\frac{360}{72} \times 8$ oe
1(b)	14	2	<b>M1</b> for $\frac{126}{72} \times 8$ oe or $\frac{126}{360} \times their\ 40$ oe
1(c)	Correct ruled line drawn	2	<b>M1</b> for $\frac{162}{3} [= 54]$ or $\frac{162}{3} \times 2 [= 108]$ or $(their\ 40 - 8 - their\ 14) \div 3 \times \frac{72}{8} [\times 2]$
1(d)	Vanilla	<b>1FT</b>	<b>FT</b> from their pie chart
2(a)	12 756 000	1	
2(b)	160	2	<b>M1</b> for $\frac{384000}{100}$
2(c)	$1.496 \times 10^8$	2	<b>M1</b> for $1.496 \times 10^k$ or 149 600 000 oe If zero scored, <b>SC1</b> for $1.496 \times 10^2$ million
2(d)(i)	0.0001	1	
2(d)(ii)	0.1 oe	1	
3(a)(i)	25	3	<b>M2</b> for $\frac{510 - (6 \times 18 + 8 \times 20)}{22}$ soi or <b>M1</b> for $6 \times 18 + 8 \times 20$ soi
3(a)(ii)	357	1	
3(b)	3.8[0]	2	<b>M1</b> for $2 \times 7.95 + 2 \times 5.95$ or better
3(c)	16 11 or 4.11 pm	2	<b>M1</b> for conversion to 1 hour and 56 mins or a complete correct method
3(d)	Complete correct method	<b>M2</b>	<b>M2</b> for 2.28... or 2.29, 2.3, 2.33... [c/g] oe or 43.75, 43.47... or 43.48, 42.85... or 42.86 [g/\$] oe or <b>M1</b> for one correct calculation
	small	<b>A1</b>	

Question	Answer	Marks	Part marks
4(a)	328	1	
4(b)	68	1	
	corresponding	1	
4(c)	72	1	
	108	1FT	FT is 180 – <i>their c</i>
	72	1FT	FT is <i>their c</i>
4(d)	165	3	M2 for $180 - \frac{360}{24}$ or $(180 \times (24 - 2) \div 24)$ or better or M1 for $\frac{360}{24}$ or $180 \times (24 - 2)$ or better
4(e)	Correct distance <i>XY</i>	1	
	Correct bearing	1	
4(e)(ii)	Rhombus	1	
4(e)(ii)	Kite	1	
5(a)(i)	7 : 8 : 9	2	M1 for 35 : 40 : 45 oe If zero scored, SC1 for 7,8,9 in wrong order
5(a)(ii)	300 225 75	3	M1 for $\frac{600}{(4 + 3 + 1)}$ or better and A1 for one correct answer in the correct place or for two correct answers not in the correct place
5(b)(i)	$\pi \times 10^2 \times 5$	M1	
	1570 to 1571	A1	
5(b)(ii)	20	2	M1 for $1600 = 4 \times l^2$ or better
5(c)	1330	1	
	1350	1	SC1 for correct but answers reversed
5(d)(i)	430	2	M1 for $1290 \times 4$ or for recognising that 1290 is 3 pieces
5(d)(ii)	21.5	1FT	1FT is $\frac{\text{their(d)(i)}}{2000} \times 100$

Question	Answer	Marks	Part marks
6(a)(i)	10, 0, -8, 10	2	<b>B1</b> for 2 or 3 correct
6(a)(ii)	Completely correct curve	4	<b>B3FT</b> for 6 or 7 correctly plotted points <b>B2FT</b> for 4 or 5 correctly plotted points <b>B1FT</b> for 2 or 3 correctly plotted points
6(b)(i)	Ruled continuous line $y = 5$	1	
6(b)(ii)	3.5	1FT	FT <i>their</i> graph
	-1.5	1FT	FT <i>their</i> graph
6(c)	-9 is below -8 oe	1	
6(d)(i)	$x = 1$	1	
6(d)(ii)	-5	1	
7(a)(i)	20	1	
7(a)(ii)	11 55	1	
7(a)(iii)	$26\frac{2}{3}$ or 26.7 or 26.66 to 26.67	2	<b>M1</b> for $96 \times 1000$ or $\frac{96}{3600}$ oe or <b>B1</b> for figs 267 or better
7(b)	Ruled horizontal line from (12 20, 16) to (12 35, 16)	1	
	Ruled line from ( <i>their</i> 12 35, 16) to ( <i>their</i> 12 35+15, 0)	2	<b>M1</b> for $\frac{16}{64}[\times 60]$
7(c)(i)	Ruled line from (11 15, 0) to (12 30, 32)	1	
7(c)(ii)	12 09	1FT	FT <i>their</i> graph
7(c)(iii)	9	1FT	FT <i>their</i> graph
7(d)(i)	0.6 oe	1	
7(d)(ii)	34	1	
7(e)(i)	39	2	<b>B1</b> for 32 or 7 and 8 seen

Question	Answer	Marks	Part marks
7(e)(ii)	715.5[0]	3	<b>M2</b> for $(\text{their } e(i) - 3) \times 18 + 3 \times 18 \times 1.25$ oe or <b>M1</b> for $(\text{their } e(i) - 3) \times 18$ or $[3] \times 18 \times 1.25$ or $[3] \times 18 \times 0.25$ oe
8(a)	trapezium	1	
8(b)(i)	4	2	<b>B1</b> for 7 cm seen
8(b)(ii)	1120 nfw	3	<b>B1</b> for 8 [cm] and 12 [cm] seen or $8 \times \text{their } (b)(i)$ [m] or $12 \times \text{their } (b)(i)$ [m] evaluated <b>M1</b> for $\frac{(\text{their}8 + \text{their}12)}{2} \times \text{their}7$ or $\frac{(\text{their}32 + \text{their}48)}{2} \times 28$ oe
8(c)	correct perpendicular bisector drawn with 2 pairs of arcs and extending across field to side <i>BC</i>	2	<b>B1</b> for correct bisector drawn without arcs or wrong arcs or correct short line with arcs or for two pairs of correct arcs
	correct angle bisector drawn with 2 pairs of arcs and extending across field to side <i>AD</i>	2	<b>B1</b> for correct bisector drawn without arcs or wrong arcs or correct short line with arcs or for two pairs of correct arcs
8(d)(i)	Accurately drawn and correct region shaded	3	<b>B1</b> for 4 cm length seen or implied <b>B1</b> one arc drawn centre <i>A</i> and touching <i>AB</i> and <i>AD</i> <b>B1</b> correct shading Maximum <b>B2</b>
8(d)(ii)	201 nfw or 201.06 to 201.09	2	<b>M1</b> for $\pi \times 16^2$ or $\pi \times \text{their radius}^2$ or better
9(a)(i)	Reflection	1	
	$x = 1$ oe	1	
9(a)(ii)	Translation	1	
	$\begin{pmatrix} -10 \\ -5 \end{pmatrix}$	1	
9(b)(i)	Correct rotation	2	<b>SC1</b> for correct rotation, wrong centre or $90^\circ$ clockwise rotation about (4, 5)
9(b)(ii)	Correct enlargement	2	<b>SC1</b> for correct enlargement, wrong centre