

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International General Certificate of Secondary Education

## **MARK SCHEME for the March 2016 series**

### **0580 MATHEMATICS**

**0580/32**

Paper 32 (Core), maximum raw mark 104

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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
<b>1 (a)</b>	1092	<b>1</b>	
<b>(b) (i)</b>	$\frac{1}{12}$ cao	<b>2</b>	<b>M1</b> for $\frac{2}{24}$ or $\frac{120}{1440}$ oe
<b>(ii)</b>	$\frac{11}{12}$ oe	<b>1FT</b>	<b>FT</b> is for 1– <i>their</i> $\frac{1}{12}$
<b>(c)</b>	428.5 429.5	<b>1</b> <b>1</b>	<b>SC1</b> for both answers correct but reversed
<b>2 (a) (i)</b>	rotation [centre] (6, 7) 180° oe	<b>1</b> <b>1</b> <b>1</b>	or enlargement SF = –1 centre (6, 7)
<b>(ii)</b>	reflection $x = 1$	<b>1</b> <b>1</b>	
<b>(iii)</b>	enlargement [centre] (6, 11) scale factor 2	<b>1</b> <b>1</b> <b>1</b>	
<b>(b)</b>	correct translation shown	<b>2</b>	<b>B1</b> for translation by $\begin{pmatrix} -3 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ 2 \end{pmatrix}$
<b>3 (a)</b>	$\frac{2}{10}$ oe	<b>1</b>	
<b>(b) (i)</b>	4 points correctly plotted	<b>2</b>	<b>B1</b> for 3 correct points
<b>(ii)</b>	positive	<b>1</b>	
<b>(iii)</b>	correct ruled line	<b>1</b>	
<b>(iv)</b>	46 to 48	<b>1FT</b>	strict <b>FT</b> from their line if positive
<b>(v)</b>	10 is not in range of recorded test 1 results	<b>1</b>	

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Question	Answer	Mark	Part marks
4	(a) (i)	9 : 4	1
	(ii)	7	2 M1 for $\frac{3}{5} \times 45$ or $45 : 3 \times 9$
	(b) (i)	4218.24 cao	3 M2 for $3750 \times 1.04^3$ oe or M1 for $3750 \times 1.04^2$ oe If zero scored SC2 for 468.24
	(ii)	33	2FT M1FT for <i>their</i> $\frac{4218.24}{126}$
		60.24	2FT M1FT for <i>their</i> $4218.24 - 126 \times \textit{their} 33$ or $(\textit{their} \frac{4218.24}{126} - \textit{their} 33) \times 126$
	(c)	17.28	1
	(d) (i)	1.85	3 M1 for $0 \times 1 + 1 \times 4 + 2 \times 12 + 3 \times 3$  M1dep for $\frac{\textit{their} 37}{20}$
	(ii)	1 1 18 [0]	2 B1 for 1 answer correct and total number of sheep = 20 or 18
	(iii)	Same total number of sheep and same total number of lambs oe	1
	5	(a)	constant cross-sectional area oe
(b)		$[AB^2] + 4^2 = 5^2$	M1
		$[AB] = \sqrt{5^2 - 4^2} = \sqrt{9}$	M1
(c)		42	3 M2 for $\frac{3 \times 4}{2} \times 7$ or M1 for $\frac{3 \times 4}{2}$ If zero scored SC1 for answer 84
		cm <sup>3</sup>	1 B1 independent
(d)	correct net drawn	3 M1 for $7 \times 4$ rectangle drawn in correct place M1 for one 3,4,5 triangle drawn correctly	

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Question	Answer	Mark	Part marks
(e)	96	2	<b>M1FT</b> for $5 \times 7 + 4 \times 7 + 3 \times 7$ oe or $2 \times \frac{1}{2} \times 3 \times 4$ or <b>FT</b> their net
6 (a)	shop	1	
(b)	[graph] steepest oe	1	
(c) (i)	$0.2 \times 20$ or $12 \times \frac{1}{3}$ oe	<b>M2</b>	<b>M1</b> for $12 \times 20$
(ii)	distance axis numbered correctly with at least 2 more numbers	1	
(d)	12	2	<b>M1</b> for $\frac{3}{0.25}$ or $\frac{3}{15} \times [60]$
(e)	ruled line from (1034, 8) to (1058, 0)	1	
(f)	16.6 or 16.55...	3	<b>M2</b> for $\frac{\text{their swimming pool distance} \times 2}{\text{their } 1058 - 1000} \times 60$ or <b>M1</b> for a $\frac{\text{dist}}{\text{time interval}}$
(g) (i)	182.2	3	<b>M1</b> for $2\pi \times 29$ <b>A1</b> for 182.2 to 182.24 <b>A1FT</b> for their A1 rounded correctly to 1dp
(ii)	274	<b>2FT</b>	<b>M1FT</b> $\frac{50000}{\text{their}(g)(i)}$ or $\frac{500}{\text{their}(g)(i) \div 100}$ If zero scored <b>SC1</b> for figs 27[44...]
7 (a) (i)	34	2	<b>M1</b> for $\frac{1732}{52}$
(ii)	3.90	<b>3FT</b>	<b>M1FT</b> for $\frac{198 \times \text{their } 34}{1732}$ <b>A1FT</b> 3.88 to 3.89 <b>A1FT</b> <i>their</i> answer rounded to nearest 10c
(b) (i)	3.9	2	<b>M1</b> for 7.8 If zero scored <b>SC1</b> for figs 38 to 40
(ii)	football ground indicated in correct position	3	<b>B1</b> for bearing of $105^\circ$ from <i>A</i> <b>B1</b> for bearing of $068^\circ$ from <i>M</i> <b>B1FT</b> for indication of the football ground's position, dpt on at least one B1

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Question	Answer	Mark	Part marks
(c) (i)	24	1	
(ii)	$3w + 4d = 29$	2	<b>B1</b> for $3w + 4d$ seen
(iii)	$[w] 7$ $[d] 2$	4	<b>M1FT</b> for correctly equating one set of coefficients <b>M1FT</b> for correct method to eliminate one variable <b>A1</b> for $w = 7$ <b>A1</b> for $d = 2$ If zero scored, <b>SC1</b> for either: 2 correct answers given or 2 values satisfying one of their original equations
(iv)	38	<b>1FT</b>	<b>FT</b> is $4 \times \text{their } 7 + 5 \times \text{their } 2$
8 (a)	correct perpendicular bisector drawn with 2 pairs of arcs	2	<b>B1</b> for correct bisector drawn without arcs or 2 pairs of correct arcs drawn
(b) (i)	correct angle bisector drawn with 2 pairs of arcs	2	<b>B1</b> for correct bisector drawn without arcs or 2 pairs of correct arcs drawn
(ii)	correct region shaded	1	dependent on a line drawn from $A$ to $BC$
(c)	correct loci drawn	3	<b>B1</b> two 4 cm arcs drawn centres $M$ and $N$ <b>B1</b> two straight lines drawn parallel to $MN$ and 4 cm from $MN$ , one on each side of $MN$ <b>B1</b> completely correct loci drawn within tolerance throughout
9 (a)	(9), 3, (-1), -3, -3, -1, 3, 9	3	<b>B2</b> for any 5 correct or <b>B1</b> for any 3 or 4 correct
(b)	completely correct curve	4	<b>B3FT</b> for 7 or 8 correct plots <b>B2FT</b> for 5 or 6 correct plots <b>B1FT</b> for 3 or 4 correct plots
(c)	(1.5, $k$ ) where $-3.5 \leq k < -3$	1	
(d) (i)	ruled line $x = 1.5$ drawn	1	
(ii)	$x = 1.5$ oe	1	