



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

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**MATHEMATICS**

**0580/32**

Paper 32 (Core)

**March 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	
<b>1</b>	<b>(a) (i)</b>	36	<b>1</b>	<b>M1</b> for 3 or 4 correct factors and no extras or for 5 correct factors and one extra
	<b>(ii)</b>	3 000 330 cao	<b>1</b>	
	<b>(iii)</b>	125	<b>1</b>	
	<b>(iv)</b>	1, 2, 4, 8, 16	<b>2</b>	
	<b>(v)</b>	Any multiple of 24	<b>1</b>	
	<b>(vi)</b>	23 or 29	<b>1</b>	
	<b>(b) (i)</b>	570 cao	<b>1</b>	
	<b>(ii)</b>	567.49 cao	<b>1</b>	
	<b>(c) (i)</b>	7	<b>1</b>	
	<b>(ii)</b>	-3	<b>1</b>	
	<b>(iii)</b>	[0].01 oe	<b>1</b>	
<b>2</b>	<b>(a)</b>	reflection	<b>1</b>	<b>SC1</b> reflection in $y = k$
		$y$ -axis oe	<b>1</b>	
	<b>(b) (i)</b>	correct reflection at (2, -1), (4, -1), (4, -5), (3, -5), (3, -2), (2, -2)	<b>2</b>	
	<b>(ii)</b>	rotation	<b>1</b>	
		[centre] (0, 0) oe	<b>1</b>	
		180°	<b>1</b>	
	<b>(c) (i)</b>	correct enlargement at (-8, 5), (-5, 5), (-5, -4), (-2, -4), (-2, -7), (-8, -7)	<b>2</b>	
<b>(ii)</b>	9	<b>2</b>	<b>M1</b> for $3 \times 3$ or $3^2$ or 45 seen If zero scored <b>SC1</b> for (correct area of their enlargement) $\div 5$	

Question	Answer	Marks	Part marks	
3	(a) (i)	$\frac{20}{5} \times (5+3)$ or $\frac{20}{5} \times 8$	M2	M1 for $\frac{20}{5}$
	(ii)	11 : 7	4	B2 for [girls=]24 and [boys=]16 or B1 for 24 or 16 or M1 for $\frac{40}{5}$  B1FT for 44:28 or <i>their</i> 24+ 20: <i>their</i> 16+ <i>their</i> (32–20) Only FT provided total is 72 before simplifying
	(b)	430.5[0]	3	M2 for $72 \times 5.75 + 2 \times 8.25$ oe or M1 for $72 \times 5.75$ or $2 \times 8.25$
	(c)	1625 or 4.25pm	2	M1 for $45 \times 3 + 2 \times 20$
	(d)	12.5	3	M2 for $\frac{3.6-3.2}{3.2} \times [100]$ oe or M1 for $3.6 - 3.2$ or $\frac{3.6}{3.2} [\times 100]$ or better
	(e) (i)	$\frac{17}{18}$ oe	1	
	(ii)	4	1	
4	(a)	90, 180	1	
	(b)	parallelogram	1	
		rhombus	1	
		kite	1	
	(c)	56 vertically opposite [to 56°]	1,1	
		56 corresponding [to 56°]	1,1	
		73 alternate [to 73°]	1,1	
	(d) (i)	113	1	
	(ii)	7.5 km	1	
	(iii)	H correct	2	B1 for correct angle or correct distance

Question	Answer	Marks	Part marks
<b>5</b> (a) (i)	15	<b>1</b>	
	(ii) $\frac{1}{4}$ oe	<b>1FT</b>	<b>FT</b> <i>their (a)(i) / 60</i>
	(b) 72	<b>1FT</b>	<b>FT</b> 18 / <i>their (a)(ii)</i> or 18 / <i>their (a)(i) × 60</i>
	(c) 34	<b>2</b>	<b>M1</b> for $[85] \times \frac{24}{60}$ or $85 \times 24 [\div 60]$ or $85 \div 60 \times [24]$
	(d) 52	<b>1FT</b>	<b>FT</b> is 18 + <i>their</i> 34
	(e)	ruled line from (10 30, 0) to (10 45, 18)	<b>1</b>
	ruled line from (10 45, 18) to (10 50, 18)	<b>1</b>	
	ruled line from (10 50, 18) to (11 14, 52)	<b>1FT</b>	<b>FT</b> (10 50, 18) to (11 14, <i>their</i> 52)
<b>6</b> (a) (i)	$\frac{6}{11}$ oe	<b>1</b>	
	(ii) 4	<b>2</b>	<b>M1</b> for 10 black marbles or $\frac{1}{3}$ is 5 marbles
	(b) (i) 155	<b>1</b>	
	(ii) $3w + 10b = 290$ oe	<b>1</b>	
	(iii) [w] 20 [b] 23	<b>3</b>	<b>M1FT</b> for correct method to eliminate one variable <b>A1</b> for $w = 20$ <b>A1</b> for $b = 23$ If zero scored, <b>SC1</b> for either: 2 correct answers given or 2 values satisfying one of their original equations
	(c) 32.5 , 37.5	<b>1,1</b>	<b>SC1</b> for both answers correct but reversed
	(d) correct net	<b>2</b>	<b>M1</b> for 5 correctly placed 3 cm by 3 cm squares and one incorrect or missing

Question	Answer	Marks	Part marks
7	(a) I, J correctly plotted (b) positive (c) (i) ruled line of best fit (ii) 16 to 19 (d) (i) D, H, I (ii) 156 (iii) 55.6 or 55.60 to 55.61 (e) 1020	1 1 1 1 2 1 2 2	    M1 for 2 correct and no extras or for 3 correct and 1 extra  M1 for $34^2 + 44^2$ or better  M1 for $\frac{(16+44)}{2} \times 34$ oe
8	(a) (i) correct angle bisector drawn with 2 pairs of arcs (ii) correct shading (b) (i) correct perpendicular bisector drawn with 2 pairs of arcs (ii) correct shading (iii) $337^\circ$ (c) correct arcs drawn and correct region shaded inside circle	2 1FT 2 1FT 1 3	B1 for correct bisector drawn without arcs or for two pairs of correct arcs  1FT  B1 for correct bisector drawn without arcs or for two pairs of correct arcs  1FT  1  B1 5 cm arc drawn centre <i>M</i> B1 4 cm arc drawn centre <i>N</i>  If zero scored, SC1 for arcs drawn wrong way round
9	(a) -2, -4, 8, 4 (b) completely correct curve (c) $y = x$ , $y = -x$ oe (d) point at (2.8, 2.8) or (-2.8, -2.8)	2 4 1,1 1FT	B1 for any 2 correct  B3FT for 9 or 10 correct plots B2FT for 7 or 8 correct plots B1FT for 5 or 6 correct plots  1,1  FT a point on their curve lying on $y = x$