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MATHEMATICS

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Paper 32 (Core)

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MARK SCHEME

Maximum Mark: 104

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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
nfw	not from wrong working
soi	seen or implied

Question	Answer	Marks	Part marks
1 (a) (i)	36	1	M1 for 3 or 4 correct factors and no extras or for 5 correct factors and one extra
(ii)	3 000 330 cao	1	
(iii)	125	1	
(iv)	1, 2, 4, 8, 16	2	
(v)	Any multiple of 24	1	
(vi)	23 or 29	1	
(b) (i)	570 cao	1	
(ii)	567.49 cao	1	
(c) (i)	7	1	
(ii)	−3	1	
(iii)	[0].01 oe	1	
2 (a)	reflection	1	SC1 reflection in $y = k$
	y-axis oe	1	
(b) (i)	correct reflection at (2, −1), (4, −1), (4, −5), (3, −5), (3, −2), (2, −2)	2	
(ii)	rotation	1	
	[centre] (0, 0) oe	1	
	180°	1	
(c) (i)	correct enlargement at (−8, 5), (−5, 5), (−5, −4), (−2, −4), (−2, −7), (−8, −7)	2	
(ii)	9	2	
			M1 for 3×3 or 3^2 or 45 seen If zero scored SC1 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 72×5.75 or 2×8.25
	(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) <i>H</i> correct	2	B1 for correct angle or correct distance

Question	Answer	Marks	Part marks
5			
(a) (i)	15	1	
(ii)	$\frac{1}{4}$ oe	1FT	FT <i>their (a)(i) / 60</i>
(b)	72	1FT	FT 18 / <i>their (a)(ii)</i> or 18 / <i>their (a)(i) × 60</i>
(c)	34	2	M1 for $[85] \times \frac{24}{60}$ or $85 \times 24 [\div 60]$ or $85 \div 60 \times [24]$
(d)	52	1FT	FT is 18 + <i>their</i> 34
(e)	ruled line from (10 30, 0) to (10 45, 18)	1	
	ruled line from (10 45, 18) to (10 50, 18)	1	
	ruled line from (10 50, 18) to (11 14, 52)	1FT	FT (10 50, 18) to (11 14, <i>their</i> 52)
6			
(a) (i)	$\frac{6}{11}$ oe	1	
(ii)	4	2	M1 for 10 black marbles or $\frac{1}{3}$ is 5 marbles
(b) (i)	155	1	
(ii)	$3w + 10b = 290$ oe	1	
(iii)	$[w]$ 20 $[b]$ 23	3	M1FT for correct method to eliminate one variable A1 for $w = 20$ A1 for $b = 23$ If zero scored, SC1 for either: 2 correct answers given or 2 values satisfying one of their original equations
(c)	32.5 , 37.5	1,1	SC1 for both answers correct but reversed
(d)	correct net	2	M1 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	1	
(b)	positive	1	
(c) (i)	ruled line of best fit	1	
(ii)	16 to 19	1	
(d) (i)	D, H, I	2	M1 for 2 correct and no extras or for 3 correct and 1 extra
(ii)	156	1	
(iii)	55.6 or 55.60 to 55.61	2	M1 for $34^2 + 44^2$ or better
(e)	1020	2	M1 for $\frac{(16+44)}{2} \times 34$ oe
8			
(a) (i)	correct angle bisector drawn with 2 pairs of arcs	2	B1 for correct bisector drawn without arcs or for two pairs of correct arcs
(ii)	correct shading	1FT	
(b) (i)	correct perpendicular bisector drawn with 2 pairs of arcs	2	B1 for correct bisector drawn without arcs or for two pairs of correct arcs
(ii)	correct shading	1FT	
(iii)	337°	1	
(c)	correct arcs drawn and correct region shaded inside circle	3	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	2	B1 for any 2 correct
(b)	completely correct curve	4	B3FT for 9 or 10 correct plots B2FT for 7 or 8 correct plots B1FT for 5 or 6 correct plots
(c)	$y = x$, $y = -x$ oe	1,1	
(d)	point at (2.8, 2.8) or (-2.8, -2.8)	1FT	FT a point on their curve lying on $y = x$