

**MARK SCHEME for the October/November 2011 question paper
for the guidance of teachers**

0580 MATHEMATICS

0580/33

Paper 3 (Core), maximum raw mark 104

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.

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Abbreviations

cao	correct answer only
cso	correct solution only
dep	dependent
ft	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
www	without wrong working

Qu.	Answers	Mark	Part Marks
1	<p>(a) 1.64 3.6(0) 1.68</p> <p>(b) (i) 9.47 ft (ii) 0.53 ft</p> <p>(c) (i) 10 31 (ii) 2 : 5 cao</p> <p>(d) 34.9</p>	<p>B1 B1 B1 1ft 1ft 2 2 1</p>	<p>ft their table ft their (i) B1 for 43 seen B1 for 18 : 45 oe</p>
2	<p>(a) (i) 11 (ii) 15 (iii) 14.5 (iv) 14</p> <p>(b) (i) 3, ..., 2 (ii) Angles of 90° and 60° Correct labels</p> <p>(c) $\frac{5}{6}$ cao</p>	<p>1 1 2 2 1 1ft 1 2</p>	<p>M1 for ordering list or substantial part of list or 14 & 15 M1 for (9 + 11 + 11 + 12 + 13 + 14 + 15 + 15 + 15 + 15 + 18 + 20) ft only if total equals 12 (Dependent) M1 for $\frac{10}{12}$ or $\frac{\text{their } 3 + 7}{\text{their } 12}$ from table</p>
3	<p>(a) 5 (b) 150 (c) 1.8</p> <p>(d) Straight line (09 25, 600) to (10 00, 600) Straight line (10 00, 600 to 10 10, 0) ft</p>	<p>1 2 3 1 2ft</p>	<p>B1 for 450 seen or implied M2 for $\frac{0.45}{0.25}$ oe (M1 for correct distance ÷ correct time) M1 for 600 ÷ 60 oe ft their graph 10 mins to time axis</p>

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4	(a) (i) Correct reflection	2	B1 if reflected in other vertical line
	(ii) Correct rotation	2	B1 if rotated about C but clockwise through 90° or correct rotation about their reflected C
	(b) (i) Translation, $\begin{pmatrix} -9 \\ -1 \end{pmatrix}$	2	B1 for translation B1 for column vector
	(ii) Enlargement, (centre) (0, 0), (sf) $\frac{1}{2}$	3	B1 B1 B1
5	(a) (i) 104	2	M1 for $360 - (52 + 140 + 92)$ implied by 76
	(ii) Parallel	1	Dependent on (i) correct
	Angle $YBX = 52^\circ$ oe	1	Dependent on word parallel already given
	(b) 36	3	M2 for $360 = 90 + 90 + x + 4x$ oe (B1 if angle T or U = 90° soi)
6	(c) 18	2	M1 if angle sum = 360 soi or long method
	(a) -4, ..., 4, ..., 4, ..., -4	2	B1 for both -4s B1 for both 4s
	(b) 7 points plotted ft Reasonable curve through at least 6 points	3ft 1ft	P2 for 5 or 6 points plotted ft P1 for 3 or 4 Only ft if shape parabola
	(c) (i) The line $x = 1$ drawn (ii) $x = 1$	1ft 1ft	
7	(d) -1.4 to -1.1, 3.1 to 3.4	2ft	B1 B1ft if not in these ranges
	(a) ..., 5, 8, 7, 6, 4, 5, ...	2	B1 for 4 or 5 correct
	(b) 40	1ft	
	(c) 4.5375 or 4.537 or 4.538 or 4.54 www3 Allow 4.5 but only with working	3	M1 for $4 \times 3 + 5 \times 3.5 + 8 \times 4 + 7 \times 4.5 + 6 \times 5 + 4 \times 5.5 + 5 \times 6 + 1 \times 6.5$ M1 dependent for dividing their 181.5 by their 40 (M1 + M1 implied by 175(.1625))

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8	(a) Correct construction with arcs	2	B1 for two correct lines without arcs or B1 for accurate arcs seen or B1 for 1 correct line with 2 arcs seen SC1 for $AC = 8$ and $BC = 10$ correct with arcs
	(b) (i) Correct construction with arcs	2ft	ft their (a) B1ft for accurate line drawn without arcs or B1ft for accurate arcs seen or B1ft for accurate line with arcs bisecting another angle
	(ii) 4.2 to 4.5	1ft	Strict ft their b(i) with intersection on opposite side of triangle
	(c) (i) Correct construction with arcs	2ft	ft their (a) B1ft for accurate line drawn without arcs or B1ft for two pairs of accurate arcs seen or B1ft for accurate line with arcs, bisecting AB or AC
	(ii) 129° to 133°	1ft	Strict ft from their C on triangle, their Y on one side of triangle and their Z on their intersection of b(i) and c(i)
	(d) Correct quadrilateral shaded	1	From their triangle
9	(a) (i) 750	3	M2 for $0.5 \times 12 \times 5 \times 25$ seen or implied (M1 for $0.5 \times 12 \times 5$ or M1 for their area of cross-section $\times 25$)
	(ii) 0.72	2ft	ft their (i) $\times 0.00096$ SC1 for 720 (or ft their (i) $\times 0.96$)
	(b) (i) $5^2 + 12^2$ $\sqrt{169}$	M1 M1	
	(ii) 64.8(0) www4	4	M2 for $2 \times \frac{1}{2} \times 12 \times 5 + 25 \times 13 + 25 \times 12 + 25 \times 5$ (M1 for any three correct) M1 for their area $\times 0.08$
10	(a) (i) 1200	1	
	(ii) $1200 + pw$	1ft	ft their (i) $+ pw$
	(iii) $\frac{1200 + pw}{15 + p}$	2ft	ft their (ii) $\div (15 + p)$ M1 for $\div (15 + p)$
	(b) (i) 96	2	M1 for $3(4)(5 + \frac{1}{2} \times 6)$ or better
	(ii) 7	3	M1 for $84 = 3b(3 + \frac{1}{2} \times 2)$ or better A1 for equation $12b = 84$ oe correct $kb = l$

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11	(a) 36, 48, 25, 24 ft	4	B1 each ft their 25 – 1
	(b) (i) n^2 oe	1	
	(ii) $n^2 - 1$ oe	1ft	ft their (i) – 1, if expression in n
	(c) (i) 25	1	
	(ii) 85	2	M1 for $7n - 3 = 592$ or better
	(d) 8192, 2 097 152	2	B1 each SC1ft $256 \times$ their 8192