UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

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

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 $YBX = 52°$ 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)
	(c) 18	**2**	**M1** if angle sum = 360 soi or long method
6	**(a)** –4, …, 4, …, 4, …, –4	**2**	**B1** for both –4s **B1** for both 4s
	(b) 7 points plotted ft	**3ft**	**P2** for 5 or 6 points plotted ft **P1** for 3 or 4
	Reasonable curve through at least 6 points	**1ft**	Only ft if shape parabola
	(c) (i) The line $x = 1$ drawn	**1ft**	
	(ii) $x = 1$	**1ft**	
	(d) –1.4 to –1.1, 3.1 to 3.4	**2ft**	**B1 B1ft** if not in these ranges
7	**(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))

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) $5^2 + 12^2$	**M1**	
	$\sqrt{169}$	**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)**$/(15 + p)$ **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 $kb = l$

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 × their 8192