UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2009 question paper

for the guidance of teachers

0581 MATHEMATICS

0581/12   Paper 12 (Core), maximum raw mark 56

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 must be read in conjunction with the question papers and the report on the examination.

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Qu.	Answers	Mark	Part Marks
1	$2 \times 8 - (5 - 4) = 15$	1	
2	$28\% < 0.283 < \frac{2}{7}$	1	
3	54.9 or 54.87 or 54.872	1	
4	252	2	W1 for 108 or 72 correctly shown on the **diagram at B.** **Or** M1 for $180 + 72$ or $360 - (180 - 72)$ soi
5	$15500 \leqslant N < 16500$	1, 1	If zero, SC1 for correct but reversed
6	$\frac{8}{3}$ **and** $\frac{12}{11}$ seen $\frac{96}{33}$ oe fraction or $2\frac{30}{33}$ oe	M1 A1	 isw incorrect cancelling after $\frac{96}{33}$ oe Final answer is a decimal, maximum M1.
7	Correct angle bisector ($\pm 2°$) with two pairs of correct arcs. Line (± 2 mm) from *B*.	2	W1 correct bisector without arcs or incorrect arcs or absent arcs. Line (± 2 mm) from *B*.
8	**(a)** $\sqrt{25}$ or 5 **(b)** $\sqrt{8}$ isw	1 1	
9	**(a)** 15 18 isw or 3.18 pm isw. **(b)** 98	1 2cao	Not 03 18 or 3 18 alone. Not 15h(ours)18 M1 for $441 \div 4.5$ (or 4h 30min or 270) Method mark is for formula with values.
10	$(x =)$ 3 and $(y =)$ 4 www	3	M1 for complete correct method for one value A1 for 1 correct answer. ww both correct W3 ww one correct W0 Reversed answer, look in working to be convinced of transcription error.
11	**(a)** Ruled line from (0, 0) to (24, 15) End point **between** (23.5, 15) and (24.5, 15). Start point within 1 mm of (0, 0) **(b)** 11 to 11.5	2 1ft	W1 for correct freehand or short of (24, 15) but within allowed limits and to at least 7 miles. If zero SC1 Ruled line from (0, 0) to (23.5, 15) or to (24.5, 15) Answer in range. If 0 or W1 gained in part **(a)** follow through line with positive gradient only ± 1 mm

12	Correct net layout	1	2 rectangles and 2 equilateral triangles (each side) in correct position to make a net.
	2 accurate, 7 cm by 4 cm, rectangles on top and bottom.	1	
	2 accurate equilateral triangles at the sides (height 3.3 cm to 3.7 cm)	1	within 2 mm of central grid line

13	**(a)** (–2, 1)	1	**All** coordinates/components reversed.
	(b) $\begin{pmatrix} 6 \\ 4 \end{pmatrix}$	1	ie **(a)** (1, –2), **(b)** $\begin{pmatrix} 4 \\ 6 \end{pmatrix}$, **(c)** (1, 0) mark 0, 0, SC1
	(c) H at (–1, 2)	1	

14	**(a)** –3 final answer	1	
	(b) 6 final answer	1	
	(c) $4s^3$ or $\dfrac{4}{s^{-3}}$ final answer	2	W1 for $4s^n$ ($n \neq 0$) or ks^3 ($k \neq 0$) seen

15	**(a)** 12	2	M1 for $32 = \dfrac{8d}{3}$ or better.
	(b) $(d =) \dfrac{3J}{m}$	2	M1 for $3J = md$ or $\dfrac{J}{m} = \dfrac{d}{3}$

16	**(a)** 1.67×10^3	2	W1 for 1.67×10^n ($n \neq 0$) or $1.(\ldots..) \times 10^3$ as answer If zero SC1 for figs 167 in answer.
	(b) 464 or 463.8(3…..)	2	M1 for $1669.8 \times 1000 \div 3600$

17	**(a)** $p(3m + 7p)$ final answer	1	Ignore check by expansion.
	(b) $14m + 23p$ www	3	W1 for $24m + 8p$ **and** W1 for $-10m + 15p$ If zero ww SC1 for $14m$ or $(+)23p$ in answer

18	**(a)** 75 Angle(s) (on a straight) line (=) 180	1, 1	Or reference to straight line and 180
	(b) 67 Angle(s) (in a) triangle (sum to) 180	1ft,1	or exterior angle (of triangle is) sum of interior (opposite) angles
	(c) 67 (vertically) opposite	1ft,1	

19	(a)	60	1	
	(b)	$36 \div 240 \times 360$ oe 54	M1 A1	oe e.g. $36 \times 90 \div 60$ W2 54 with some relevant working shown
	(c) (i)	116 to 118	1	
	(ii)	32.5 or their (c) (i) $\div$ 3.6	2ft	M1 for their (c) (i) $\div 360 \times 100$ Or for their (c) (i) $\times (60 \div 90) \div 240 \times 100$ Allow revised angle in range 116 – 118 seen with working