CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2012 series

0581 MATHEMATICS

0581/32 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.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

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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) (i)** 94 500 ÷ (7 + 6 + 5) or 94 500 ÷ 18	**M1**	
	Multiply by 5	**M1dep**	dependent on first mark
	(ii) 36 750	**1**	
	(b) (i) 3960	**2**	**M1** for $0.5 \times (76 + 100) \times 45$ oe
	(ii) $\frac{3960}{26250}$ oe	**1ft**	Ft for $\frac{\text{their } \textbf{(b)(i)}}{26250}$ provided answer is integer/integer and less than 1
	(c) 83.3(3...)	**1ft**	Ft for $\frac{30625}{\text{their } \textbf{(a)(ii)}} \times 100$
	(d) (i) 10 9	**1, 1**	
	(ii) $1 - \frac{10}{24} - \frac{9}{24}$	**M1ft**	Accept 1 – 19/24
	(iii) 45	**1**	
2	**(a) (i)** 2 –7 2	**1,1,1**	
	(ii) 12 correctly plotted points	**3ft**	**P2ft** for 10 or 11 correct. **P1ft** for 8 or 9 correct
	2 smooth curves through 12 correct points and correct shape	**C1**	
	Two separate branches not crossing the *y*-axis	**B1**	
	(iii) 2	**1**	
	(iv) 2.7 to 3.0,	**1**	
	–3.0 to –2.7	**1**	

	(b) **(i)** $\frac{1}{2}$ or 0.5	**1**	
	(ii) −1 1 5	**2**	**B1** for 2 correct
	(iii) Correct ruled continuous line drawn	**1**	
	(c) (5.0 to 5.2, 3.5 to 3.7) (−3.2 to −3.0, −0.7 to −0.5)	**1ft** **1ft**	Ft ± 0.1 from their intersections
3	**(a)** Translation $\begin{pmatrix} -6 \\ -5 \end{pmatrix}$	**1** **1**	
	(b) **(i)** Correct reflection	**1**	
	(ii) Correct rotation	**2**	**SC1** for 90° anti-clockwise about *A* or 90° clockwise about any other point.
	(c) Points *Q* and *R*	**1, 1**	
4	**(a)** Parallelogram 0 Kite 1 Rhombus 2 Trapezium 0	**1,1** **1,1** **1,1** **1,1**	
	(b) **(i)** *Q* or *RQP* or *PQR*	**1**	
	(ii) 15	**2**	**M1** for a complete correct method
5	**(a)** **(i)** Angle measured 80° 60 ÷ their 80° × 360° oe	**B1** **M1**	
	(ii) (Blue) 47, 48 or 49 (Green) 56, 57 or 58	**3**	Or 2 for 1 correct or answers transposed Or **B1** for 64°±1° (blue) or 76°±1° (Green) seen **SC2** for 2 decimal answers in range
	(b) **(i)** 52°	**2**	**M1** for 39 ÷ 270 × 360 oe
	(ii) Correct line drawn 52° Correct labels	**1ft** **1ft**	Ft if *their* **(b)(i)** is less than 140°
	(c) **(i)** Bar chart with – vertical axis correctly scaled	**1**	**B1** for linear vertical scale to at least 40 shown
	– bars of correct and equal width, – and with equal or no gaps	**2**	**B2** for all bars of correct heights and equal widths with equal or no gaps Or **B1** for all bars of correct heights but unequal widths/gaps or at least 3 bars of correct heights and equal widths
	(ii) 360	**2**	**M1** for 9 × 40 or 40/100 × 900 oe

6	**(a)** **(i)** (0)710	**1**	Accept (0)710 am
	(ii) 1 (h) 10 (min)	**1**	
	(b) Line from (08 20, 50) to (11 40, 142)	**1**	
	(c) Correct lines To (1200, 142)	**1ft**	1ft for a horizontal line from their (11 40, 142) of length two small squares.
	Then to (12 30, 162)	**2ft**	2ft is for line from end of their horizontal line 3 small squares across and 10 small squares up. **B1** for line from end of their horizontal line 10 small squares up or **M1** for 40 × 30 ÷ 60 (implied by 20 kilometres seen)
	(d) 27	**2**	**M1ft** for their total distance ÷ their time in hours **SC1** for 36 or 24.9...
	(e) **(i)** Line (10 10, their 142) to (13 20, 50)	**2**	**B1** for one of (10 10, their 142) or (13 20, 50) plotted.
	(ii) 70 to 72 (km)	**1ft**	Ft is their intersection−50, half square accuracy.
7	**(a)** Arc of circle 3.5 cm from *T*.	**2**	**M1** for any arc, centre *T*.
	(b) **(i)** Correct construction with 4 correct arcs	**2**	**B1** for correct but without 4 arcs
	(ii) Bisector of *QR* with 2 pairs of arcs.	**2**	**B1** for correct but without 2 pairs of arcs
	(c) **(i)** *F* in correct region	**1dep**	Dependent on at least **B1** and **B1** in **(b)**

	(ii) 1200 to 1700 (m^2)	**4dep**	Dependent on at least **B1** and **B1** in (If at least **B1** and **B1** in **(b)** then **B1** for base $33 \leqslant \mathbf{b} \leqslant 37$(m) or $3.3 \leqslant \mathbf{b} \leqslant 3.7$(cm) **B1** for height $70 \leqslant \mathbf{h} \leqslant 96$(m) or $7.0 \leqslant \mathbf{h} \leqslant 9.6$(cm) **M1** for ½ × *their base* × *their height* If **B0** in either **(b)(i)** or **(b)(ii)** but *F* marked in any triangle **SC1** for *their base* ± 2(m) or ± 0.2(cm) **SC1** for *their perpendicular height* ± 2(m) or ± 0.2(cm) **SC1** for ½ × *their base* × *their height*
8	**(a)** **(i)** Diagram 4 correctly drawn	**1**	Clear intention
	(ii) 17 22 27	**2**	**B1** for 2 correct or a gap of 5 between Diagrams 3 and 4 **and** 4 and 5.
	(b) **(i)** $5n + 2$ oe final answer	**2**	**B1** for $jn + 2$ ($j \neq 0$) or $5n + k$
	(ii) 147	**1ft**	Ft a linear expression
	(c) **(i)** 8	**1**	
	(ii) $4n - 4$ oe final answer	**2**	**B1** for $jn - 4$ ($j \neq 0$) or $4n + k$
	(d) $n + 6$ cao	**1**	
9	**(a)** **(i)** $6d + 160 = 430$ oe	**1**	
	(ii) 45	**2ft**	Ft for $pd + q = r$ p, q and $r \neq 0$ and $p \neq 1$ **M1ft** for 1st step correct **SC1** for 270
	(iii) 184 or \$1.84	**2**	**M1** for 1.15×160 oe **SC1** for answer 1.84
	(b) **(i)** $3p + 2c = 92$ oe	**1**	Final answer
	(ii) $2p + 5c = 153$ oe	**2**	**B1** for $2p + 5c$ seen

	(iii) (p =) 14 (c =) 25 cao	**4**	**M2ft** for correct method to eliminate variable **A1** for a correct answer If not **M2** **M1** for 2 equations with common coefficients of p or c seen or **M1** for correct rearrangement to $p=$ or $c=$ seen