UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2008 question paper

0580 and 0581 MATHEMATICS

0580/03 and 0581/03 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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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Abbreviations

art answer rounding to
cao correct answer only
ft follow through after an error
oe or equivalent
soi seen or implied
SC Special Case

Qu	Answers	Mark	Part Marks
1 (a) (i)	$\frac{3}{5} \times 30\,000$ or $30\,000 - \frac{2}{5} \times 30\,000$	M1	Must see evidence of fractions
(ii)	Aida $7500 Bernado $6000 Christiano $4500	W3	M1 for $\frac{5 \text{ or } 4 \text{ or } 3}{5+4+3} \times 18000$ A1 for 1 correct answer
(b) (i)	10 500	W2	M1 for $\frac{35}{100} \times 30\,000$ or $0.35 \times 30\,000$
(ii)	$\frac{13}{60}$	W2	W1 for $\frac{6500}{30000}$ seen or other 'correct' fraction.
(iii)	($)13 000	W1ft	
(c)	24	W3cao	M1 for 15 500 – 12500 or $\frac{15500}{12500} \times 100$ M1 for $\frac{'3000'}{12500} \times 100$ or '124'– 100
2 (a) (i)	52.3 art	W2cao	M1 for 55cos18°
(ii)	24.4 art	W2 ft	M1 for '52.3'tan25°. Ft their ED
(iii)	17.0 art	W2cao	M1 for 55sin18° or $\sqrt{(55^2 - '52.3'^2)}$ or '52.3' tan18° Long methods, e.g. sine rule must be explicit and 'correct'.
(b)	'24.4' – '17.0' (= 7.4)	M1	Allow for clear attempt to find *FD* – *AD*.
(c) (i)	14.1 art	W2cao	M1 for $\sqrt{(12^2 + 7.4^2)}$ or correct long methods $12 \div \cos(\tan^{-1}\frac{7.4}{12})$ or $7.4 \div \sin(\tan^{-1}\frac{7.4}{12})$
(ii)	31.7 art	W2cao	M1 for $\tan(FBA) = \frac{7.4}{12}$ oe or $\sin FBA = \frac{7.4}{'FB'}$ or $\cos FBA = \frac{12}{'FB'}$
3 (a) (i)	12	W1	
(ii)	7	W1	
(iii)	8.5	W2	M1 for Attempt at ordering the data.
(b)	10 points correctly plotted	W3	W2 for 8 or 9 points correctly plotted W1 for 6 or 7 points correctly plotted

Qu	Answers	Mark	Part Marks
(c) (i)	8.58(3…) or 8.6	W2	M1 for attempt at totalling data ÷ 12 Allow method if 1 error or omission, but must see an attempt (or judge implied) to divide by 12
(ii)	Plotted (their **(c)(i)**, 38.8)	W1ft	
(d) (i)	Line of fit	W1	Line must indicate understanding
(ii)	Negative	W1	
4 (a)	22° Tangent (and) radius/ diameter (meet at) 90°	W1cao W1	Degree symbol not essential throughout question. Allow perpendicular for 90°
(b)	90° (Angle in a) semi-circle	W1cao W1	
(c)	68° (Angles in a)triangle (=)180°	W1ft W1	Ft is180 –(their **(a)** + their **(b)**) or alternate segment (theorem)
(d)	68° Alternate or *Z* (angles)	W1cao W1	Allow Z correctly placed on the diagram.
5 (a)	6	W1	
(b) (i)	10 30	W2	M1 for $\frac{15}{20}$ SC1 for 10 15
(ii)	Line from 09 30 to 0945 Line to (‘10 30’, 18)	W1 W1ft	accuracy ± 1mm
(c) (i)	20	W1	
(ii)	Line (11 15, 0) to (their 11 35, 18)	W1ft	ft their time in **(c)(i)** provided in minutes and ⩽ 45 Line (11 15, 0) to (11 [15 + ‘20’], 18)
(d) (i)	Line (12 00,18) to (12 45,0)	W1	
(ii)	24	W2	M1 for 18 ÷ 0.75 Allow 18 ÷ 45 × 60 for method
6 (a) (i)	(y =)13	W2	M1 for (2y =) 75 – 7 × 7
(ii)	(x =) 9	W2	M1 for 7x = 75 – 12 or –7x = 12 – 75
(b)	$\frac{75-2y}{7}$ or $\frac{2y-75}{-7}$	W2	M1 for 7x + 2y = 75. 7x = 75 – 2y or –7x = 2y – 75 or –7x – 2y = –75

Qu	Answers	Mark	Part Marks
(c)	$(x =)$ 11, $(y =) -1$	W3	M1 for multiply and correct add/subtract or correct substitution. A1 for $x = 11$ or $y = -1$
7 (a)	3, −3, 3	W3	W1 for each correct value
(b)	8 correctly plotted points Smooth curve	W3ft W1	W2 for 6 or 7 points, W1 for 4 or 5 points Half square accuracy must go below line $y = -3$
(c)	(−0.5, −3.25)	W2ft	W1 for one coordinate correct Ft their graph but $-1 < x < 0$ and $y < -3$ Allow calculated if exact values (W2 or W1)
(d) (i)	Line $x = -0.5$ drawn	W1cao	Half square accuracy
(ii)	$x = -0.5$ oe	W1ft	Ft any vertical line only
8 (a) (i)	(−3, −2)	W1	
(ii)	$(AB =) \begin{pmatrix} 4 \\ 2 \end{pmatrix}$, $(BC =) \begin{pmatrix} -3 \\ 2 \end{pmatrix}$	W1, W1	SC1 for $\begin{pmatrix} 2 \\ 4 \end{pmatrix}$ **and** $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$
(b)	(1, −5), (5, −3), (2, −1)	W2	W1 for 2 correct points plotted Must join points, with straight lines, for both marks.
(c) (i)	P(5, 2), Q(−1, 6)	W1, W1	
(ii)	Enlargement (Scale factor) 2 (Centre) A or (−3, −2)	W1 W1 W1ft	Ft their **(a)(i)** Zero if not a single transformation
(d)	(0, −4) marked Joined to A and B	W1 W1ft	Their image of C joined to A and B.
9 (a) (i)	99 to 101 (metres)	W1	
(ii)	103° to 105°	W1	
(b) (i)	Bisector of angle ABC (45 ± 1 to BC) with arcs	W2	W1 correct bisector without arcs
	Bisector of AD with arcs ±1mm from centre of AD and 89° to 91° to AD.	W2	W1 correct bisector without arcs. Bisector about 89° to 91° to AD by eye and centre within 2mm by eye.
(ii)	Closed region T indicated	W1	Dependent on at least W1 for each bisector. Allow T omitted if region is clear.

Qu	Answers	Mark	Part Marks
(c)	Lines parallel to and 3cm (±0.1cm) from *AB* and *BC*. Lines joined by arc, centre *B*. radius 3cm (±0.1cm)	W1 W1	
10 (a)	(Lines) 10 and 13 (Dots) 8 and 10	W1 W1	
(b)	(Lines) 31, (Dots) 22	W1, W1	
(c) (i)	$3n + 1$ oe	W2cao	SC1 for $jn + 1$ or $3n + k$ where j and k are integers. $j \neq 0$
(ii)	$2n + 2$ oe	W2cao	SC1 for $jn + 2$ or $2n + k$ where j and k are integers. $j \neq 0$
(d)	$n - 1$ or $1 - n$	W2ft	M1 for '$(3n + 1)$' – '$(2n + 2)$' or reversed Ft and M1 dependent on two linear algebraic expressions