

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 $\frac{13000}{12500} \times 100$ or '124' – 100 |
| 2 (a) | (i) 52.3 art | W2cao | M1 for $55\cos 18^\circ$ |
| | (ii) 24.4 art | W2 ft | M1 for '52.3'tan25°. Ft their ED |
| | (iii) 17.0 art | W2cao | M1 for $55\sin 18^\circ$ 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 | M1 for Attempt at ordering the data. |
| | (ii) 7 | W1 | |
| | (iii) 8.5 | W2 | |
| (b) | 10 points correctly plotted | W3 | W2 for 8 or 9 points correctly plotted W1 for 6 or 7 points correctly plotted |

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| (c) (i) | 8.58(3...) or 8.6 | W2 | M1 for attempt at totalling data $\div 12$ Allow method if 1 error or omission, but must be 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 is 180 – (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 ± 1 mm |
| (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 $18 \div 0.75$ Allow $18 \div 45 \times 60$ for method |
| 6 (a) (i) | (y =)13 | W2 | M1 for $(2y =) 75 - 7 \times 7$ |
| (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 $-7x - 2y = -75$ |

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|-----------|---|------------------|---|
| (c) | $(x =) 11, (y =) -1$ | W3 | M1 for multiply and correct add/subtract or 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 | SC1 for $\begin{pmatrix} 2 \\ 4 \end{pmatrix}$ and $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$ W1 for 2 correct points plotted Must join points, with straight lines, for both marks. Ft their (a)(i) Zero if not a single transformation Their image of C joined to A and B . |
| (ii) | $(AB =) \begin{pmatrix} 4 \\ 2 \end{pmatrix}, (BC =) \begin{pmatrix} -3 \\ 2 \end{pmatrix}$ | W1, W1 | |
| (b) | $(1, -5), (5, -3), (2, -1)$ | W2 | |
| (c) (i) | $P(5, 2), Q(-1, 6)$ | W1, W1 | |
| (ii) | Enlargement (Scale factor) 2 (Centre) A or $(-3, -2)$ | W1 W1 W1ft | |
| (d) | $(0, -4)$ marked Joined to A and B | W1 W1ft | |
| 9 (a) (i) | 99 to 101 (metres) | W1 | W1 correct bisector without arcs W1 correct bisector without arcs. Bisector about 89° to 91° to AD by eye and centre within 2mm by eye. Dependent on at least W1 for each bisector. Allow T omitted if region is clear. |
| (ii) | 103° to 105° | W1 | |
| (b) (i) | Bisector of angle ABC $(45 \pm 1$ to $BC)$ with arcs Bisector of AD with arcs ± 1 mm from centre of AD and 89° to 91° to AD . | W2 W2 | |
| (ii) | Closed region T indicated | W1 | |

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| (c) | Lines parallel to and 3cm (± 0.1 cm) from AB and BC . Lines joined by arc, centre B . radius 3cm (± 0.1 cm) | 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 |

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