# MARK SCHEME for the October/November 2010 question paper

# for the guidance of teachers

# 0581 MATHEMATICS

0581/33        Paper 3 (Core), maximum raw mark 104

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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 |
| art | anything rounding to |
| soi | seen or implied |

| Qu. | Answers | Mark | Part Marks |
|---|---|---|---|
| **1** | **(a)**  10, 9, 5, 5, 1 | 3 | **B2** for 4 correct, **B1** for 3 correct |
| | **(b) (i)**  2 | 1 | |
| | **(ii)**  2.5 | 2 | **M1** for evidence of finding mid-value of 20 pieces of data |
| | **(iii)**  2.6 | 3 | **M1** for evidence of $\sum fx$ then **M1dep** for ÷ 40 |
| | **(c) (i)**  81 or 45 | 2ft | ft their 9 or their 5 **M1** for their 9 or their 5 ÷ 40 × 360 |
| | 45 or 81 | 1ft | Correct or ft 126 – their first angle |
| | **(ii)**  Correct angles of 81° and 45° | 1ft | ft only if add up to 126 |
| **2** | **(a) (i)**  18 30 oe | 1 | |
| | **(ii)**  251 (250.9…) | 3 | **M1** for distance ÷ time (any units) and **M1** for 55 ÷ 60 oe |
| | **(b) (i)**  1400 | 2 | **M1** for 9121 ÷ 6.515 |
| | **(ii)**  20.7(2…) | 1 | |
| | **(iii)**  91 | 2 | **B1** for 90.89 or 90.9 or 90.8 or 610 × 0.149 or **B1** (indep) for correct rounding to integer if from a decimal |
| **3** | **(a) (i)**  Translation $\begin{pmatrix} -5 \\ 3 \end{pmatrix}$ | 1, 1 | |
| | **(ii)**  Reflection in line $y = 4$ | 1, 1 | Line can be labelled on diagram |
| | **(iii)**  Rotation, (2, 2.5), 180° or half-turn | 1, 1, 1 | Centre could be labelled on diagram |
| | **(b) (i)**  Correct reflection in $y$-axis | 2 | **SC1** for reflection in $x$-axis |
| | **(ii)**  Correct enlargement, (0, 0), factor 4 | 2 | **SC1** for any enlargement centre (0, 0) or factor 4 |

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| 4 | (a) (i) 214 (213.6…) | 2 | **M1** for $75^2 + 200^2$ |
|---|---|---|---|
| | (ii) 20.6 or (20.55 – 20.56) | 2 | **M1** for tan = 75/200 or sin = 75/their **(i)** or cos = 200/their **(i)** |
| | (b) (i) (0)44  ((0)44.4…) | 1ft | **B1** 65 – their **(a)(ii)** if < 65 |
| | (ii) 224 (224.4…) | 1ft | 180 + their **(b)(i)** |
| | (iii) 335 | 2 | **B1** for 65 below *B* or 25 above *B*, may be on diagram |
| 5 | (a) (i) Accurate perpendicular bisector of *AB* with arcs | 2 | **SC1** if accurate without arcs or accurate bisector of wrong side with arcs |
| | (ii) Accurate bisector of angle *ADC* | 2 | **SC1** if accurate without arcs or accurate bisector of wrong angle with arcs |
| | (b) Ruled line 2 cm from and parallel to *BC* | 2 | **SC1** if not ruled |
| | (c) Correct region shaded  cao | 1 | Dependent on at least **SC1** in **(a)(i)**, **(a)(ii)** and **(b)** |
| 6 | (a) (i) 60 | 2 | **M1** for full method for area with correct values |
| | (ii) 1200 | 1ft | ft their **(i)** × 20 |
| | (b) (i) 10.2 | 2ft | **SC1** for figs 102 or **M1** for **(a)(ii)** × 8.5 ÷ 1000 ft their **(a)(ii)** × 8.5 ÷ 1000 and SC in same way |
| | (ii) 23.05 | 2ft | ft their **(b)(i)** × 2.26 **M1** for 23.052 or 23.1 or **(b)(i)** × 2.26 or **B1ind** for correctly rounding to 2 dp an answer with more than 2 dp |
| 7 | (a) 2*d* – 9 | 2 | **SC1** for 9 – 2*d* |
| | (b) 8.4(0) | 2 | **M1** for their **(a)** = 7.8(0) |
| | (c) 0.6(0) | 1ft | ft their **(b)** – 7.80, **only** if positive |
| 8 | (a) 35.3 art | 2 | **M1** for substituting *r* = 7.5 in formula |
| | (b) $\sqrt{\dfrac{5A}{\pi}}$ | 3 | **M1** for correctly multiplying by 5 **M1** for correctly dividing by $\pi$ **M1** for correctly taking a square root |
| | (c) 2.76 art  cao | 2 | **M1** for substituting 4.8 in their **(b)** or if working backwards from original formula, substituting and reaching $r^2 = 5 × 4.8 ÷ \pi$ |

| 9 | (a) | (i) | 8, 3 | 1, 1 | |
|---|---|---|---|---|---|
| | | (ii) | 5 points correctly plotted | 2ft | **P1** for 4 correct points ft |
| | | | Smooth curve through their 5 points | 1 | |
| | | (iii) | $3.4 \leqslant x \leqslant 3.6$ | 1ft | ft their intersection with $x$-axis |
| | (b) | (i) | 3, 2, 1.5 | 1, 1, 1 | **B1** each |
| | | (ii) | 8 points correctly plotted | 2ft | **P1** for 6 or 7 points |
| | | | Smooth branch of rectangular hyperbola through 12 points | 1 | |
| | (c) | | $(1 < x \leqslant 1.2, 10.6 \leqslant y < 11)$ | 1ft | ft to same accuracy intersections of their two |
| | | | $(2.6 \leqslant x < 3, 4.2 \leqslant y \leqslant 4.5)$ | 1ft | graphs |
| 10 | (a) | | $360 \div 8 \ (= 45)$ | 1 | Alt method $180 \times (8 - 2)$ |
| | | | Then $180 -$ their $45 \ (= 135)$ | 1dep | Then their $1080 \div 8 \ (= 135)$ |
| | (b) | (i) | 45 | 1 | |
| | | (ii) | 90 | 1 | |
| | (c) | (i) | 35.99 to 36.(0) | 2 | **M1** for $0.5 \times 8.485 \times 8.485$ |
| | | (ii) | 695 to 696.4 | 3ft | **M1** for $(12 + 8.485 + 8.485)^2$ |
| | | | | | **M1ind** for correct collection of area with or without values indicated |
| 11 | (a) | (i) | $5 + 8 \ (= 13)$ | 1 | |
| | | (ii) | 12, 19 | 1 | |
| | | | 10, 17 | 1 | |
| | | | 7, 9 | 1 | |
| | | | 3, 6 | 1 | |
| | | | 4, 5 | 1 | |
| | | | 3, 2 | 1 | |
| | (b) | (i) | 11 | 1 | |
| | | | $2n - 1$ | 2 | **B1** for $2n \pm k$ or $jn - 1 \ (j \neq 0)$ |
| | | (ii) | 36    $n^2$ | 1, 1 | |
| | | (iii) | $\dfrac{1}{6}$    $\dfrac{1}{n}$ | 1, 1 | |