

Mark Scheme (Results)

Summer 2007

GCE

O Level Mathematics B (7361_02)

7361 Paper 2, Summer 2007
Mark Scheme

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|-----------|-----|--|--|-------------|----------|
| 1. | (a) | 7 | B1 | 1 | |
| | (b) | 5 | B1 | 1 | |
| | (c) | 9 | B1 | 1 | 3 |
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| 2. | (a) | 30×4.5 , 135 (km) | M1, A1 | 2 | |
| | (b) | $[2 \times c's(135)] / (7.5 + 4.5)$, 22.5 (km/h) | M1, A1 | 2 | 4 |
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| 3. | (a) | any pair of brackets multiplied out (one error) | M1 | | |
| | | all three brackets multiplied out and collected (one term incorrect). The expression must be a cubic | M1 dep | | |
| | | $x^3 - 7x + 6$ | A1 | 3 | |
| | (b) | $c's(x^3 - 7x + 6) = 349 - 7x$ with c's terms gathered correctly | M1 | | |
| | | $x = 7$ | A1 | 2 | 5 |
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| 4. | (a) | (i) | $\begin{pmatrix} 4p-4 & -15 \\ 2p+12 & 17 \end{pmatrix}$ | B2(-1 eoo) | |
| | | (ii) | $\begin{pmatrix} 4p-4 & -p-6 \\ 30 & 17 \end{pmatrix}$ | B2 (-1 eoo) | 4 |
| | (b) | Either $c's(2p + 12 = 30)$ or $c's(-p - 6 = -15)$ | M1 | | |
| | | $p = 9$ | A1 | 2 | 6 |
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5. NB: Acceptable alternative methods, using different angles, are awarded the corresponding marks.

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|-----|--|-------|---|----------|
| (a) | $\angle TAD = 64^\circ$ | M1 | | |
| | $\angle CAT = 90^\circ$ | M1 | | |
| | any one valid reason for either of the above angles | A1 | | |
| | $\angle CAD = 26^\circ$ | A1 ft | 4 | |
| (b) | $\angle ABD = 64^\circ$ (with or without reason) | M1 | | |
| | $\angle BAD = 58^\circ$ (with reason (if not given above)) | M1 | | |
| | $\angle BAC = 32^\circ$ | A1 | 3 | |
| (c) | $\angle BXA = 84^\circ$ (angle sum of triangle) | M1 | | |
| | $\angle CXD = 84^\circ$ | A1 | 2 | 9 |

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| 6. | (a) | $BF/6 = \tan 36^\circ$ (o.e.), 4.36 cm | M1, A1 | 2 | |
| | (b) | $FC/13 = \sin 54^\circ$ (o.e.), 10.52 cm | M1, A1 | 2 | |
| | (c) | $BA/13 = \sin 36^\circ$ (o.e.) | M1 | | |
| | | $AE = c's(BA) - 6$ | M1 dep | | |
| | | $AE = 1.64$ cm | A1 | 3 | |
| | (d) | Writing down an expression for an area which would enable the candidate to arrive at the required answer on completion of method. | M1 | | |
| | | i.e. Area of rectangle $ABCD = c's(BC) \times c's(AB)$ | | | |
| | | A completely correct method for the required area | M1 dep | | |
| | | 60.41 cm^2 or 60.42 cm^2 | A1 | 3 | 10 |

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| 7. | (a) | (i) | $\mathbf{a + b - c}$ | B1 | | | | | |
| | | (ii) | $-\mathbf{a + c + \frac{1}{2}(a + b - c)}$ | M1 | | | | | |
| | | or | $\underline{\mathbf{b}} - \frac{1}{2}(\underline{\mathbf{a}} + \underline{\mathbf{b}} - \underline{\mathbf{c}})$ | | | | | | |
| | | | $\frac{1}{2}(\mathbf{b + c - a})$ | A1 | | | | | |
| | (iii) | | $(\mathbf{b + c - a})/5$ | B1 ft | 4 | | | | |
| | (b) | | $-\mathbf{a + \frac{2}{5}(a + b)}$ or $\mathbf{b + \frac{3}{5}(-b - a)}$ | M1 | | | | | |
| | | | $\frac{2}{5}\mathbf{b - \frac{3}{5}a}$ | A1 | 2 | | | | |
| | (c) | | $\mathbf{c's[(b + c - a)/5] = c's[\frac{2}{5}b - \frac{3}{5}a]}$ | M1 | | | | | |
| | | | conclusion → | A1 | 2 | | | | |
| | (d) | | $\mathbf{CB = a - c + c + 2a}$ | M1 | | | | | |
| | | conclusion | A1 | 2 | 10 | | | | |
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| 8. | (a) | (i) | -9 | (ii) | -2/3 | (iii) | 61 | B1,B1,B1 | 3 |
| | | (b) | $\mathbf{xy = 1 + 2y}$ (o.e.) | M1 | | | | | |
| | | $(\mathbf{1 + 2x})/x$ (o.e.) | A1 | 2 | | | | | |
| | (c) | $(\mathbf{x \neq}) 0$ | B1 | 1 | | | | | |
| | (d) | | $(\mathbf{2x - 3})(\mathbf{2x - 3}) - 4 (= 0)$ | M1 | | | | | |
| | | | $\mathbf{4x^2 - 12x + 5 (= 0)}$ | A1 | | | | | |
| | | | attempt to factorise quadratic | M1 | | | | | |
| | 0.5, 2.5 | A1, A1 | 5 | 11 | | | | | |
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| 9. | (a) | $9/10 \times 2/3, 3/5$ (o.e.) | M1, A1 | 2 | |
| | (b) | either $1/10 \times 2/3$ or $9/10$ or $2/3$ or $9/10 \times 1/3$ | M1 | | |
| | | adding a correct 2 nd term | M1 dep | | |
| | | or | | | |
| | | $1/10 \times 1/3, 1 - 1/10 \times 1/3$ | | | |
| | | $29/30$ (o.e.) | A1 | 3 | |
| | (c) | $1/5 \times 1/10 \times 1/3, 1/150$ (o.e.) | M1, A1 | 2 | |
| (d) | $1/10 \times 1/3 \times 4/5, 2/75$ (o.e.) | M1, A1 | 2 | | |
| (e) | c's(d) x 300, 8 days | M1, A1 | 2 | 11 | |
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| 10. | (a) | $80 - 2.5 - 2.x$ (o.e.), $70 - 2x$ | M1, A1 | 2 | |
| | (b) | $CM = 4$ m | B1 | 1 | |
| | (c) | $x \cdot (c's(76 - 2x))$ | M1 | | |
| | | $\frac{1}{2} [(76 - 2x) + (70 - 2x)] \times 4$ | M1 | | |
| | | $c's(76x - 2x^2) + c's(292 - 8x)$ | M1 dep | | |
| | | $292 + 68x - 2x^2$ (conclusion) | A1 | 4 | |
| | | or | | | |
| | | $(x + 4)(76 - 2x), -12$ | M1, M1 dep | | |
| | | $76x - 2x^2 + 304 - 8x$ | M1 | | |
| | | $292 + 68x - 2x^2$ (conclusion) | A1 | | |
| | (d) | $68 - 4x, = 0$ | M1, M1 dep | | |
| | | 17 m | A1 | 3 | |
| | (e) | substituting c's (d) into $292 + 68x - 2x^2, 870$ (m ²) | M1, A1 | 2 | |
| (f) | c's(17) + 4 and $76 - 2 \times c's(17) - 3$ | M1 | | | |
| | $\sqrt{(c's(21^2) + c's(39^2))}$ | M1 dep | | | |
| | 44 m | A1 | 3 | 15 | |
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| 11. | (a) | 8.5, 27, -5, -8 | B3(-1 eeo) 3 | |
| | (b) | graph penalties -1 mark for incorrect/non uniform scale straight line segments each point missed ($\pm\frac{1}{2}$ small square) each missed segment each point not plotted each point incorrectly plotted ($\pm\frac{1}{2}$ small square) tramlines very poor curve | B3 | 3 |
| | (c) | Drawn tangent -16 \rightarrow -22 | M1 A1 | 2 |
| | (d) | At least two values from c's graph intersecting with the x axis At least one range statement with at least one of c's critical values Two range statements consistent with c's graph and one correct critical value $x < -1.7$ and $2.6 < x < 4.5$ | M1 M1 M1 dep A1 | 4 |
| | (e) | $y = 20 - 4x$ drawn Three values written down from the intersection of c's straight line with the cubic $x = 2$ -1.1 and 4.6 | M1 B1 A1 A1 | 4 |
| | | | | 16 |
