

MARK SCHEME for the May/June 2012 question paper
for the guidance of teachers

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/33

Paper 3 (Core), maximum raw mark 96

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 must be read in conjunction with the question papers and the report on the examination.

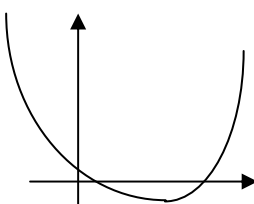
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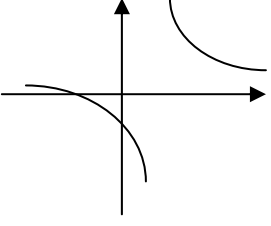
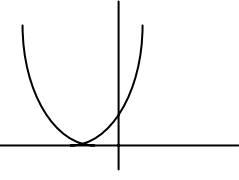
| Page 2 | Mark Scheme: Teachers' version | Syllabus | Paper |
|--------|--------------------------------|----------|-------|
| | IGCSE – May/June 2012 | 0607 | 33 |

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|------------|------------------------|--|--|---|
| 1 | (a) | 11 15 | 2 | B1 for 11:50 or 3hrs 5 mins seen |
| | (b) | 17 50 | 2 | B1 for 21:50 or 10:20 seen |
| | (c) | 8192 | 3 | M2 for $(4 \times 1600) \times 1.28$ oe or M1 for 1600×1.28 oe A1 for 2048 |
| | (d) | 545.45 | 2 | M1 for $3000 \div 5.50$, implied by 545 or 545.5 or 545.45.... [9] |
| 2 | (a) (i) | 0.2 oe | 1 | |
| | (ii) | 0.64 oe | 2 | M1 for 0.8×0.8 oe |
| | (b) (i) | 56 | 1 | |
| | (ii) | 57 | 1 | |
| | (iii) | 58 | 1 | |
| | (iv) | 5147 | 1 | |
| (c) | 57.8 or 57.77 to 57.78 | 2 | M1 for evidence of using midpoints [9] | |
| 3 | (a) | 150 | 4 | M1 for 9×5 , M1 for $\frac{1}{2} \times 15 \times 8$, M1 for $\frac{1}{2} \times 10 \times 9$ |
| | (b) (i) | 13.5 (13.45...) | 2 | M1 for $10^2 + 9^2$ |
| | (ii) | 72.5 (72.45...) ft | 2ft | ft 59 + their (b)(i) M1 for $17 + 10 +$ their $13.5 + 10 + 5 + 9 + 8$ [8] |
| 4 | (a) | Reflection (only) $x = -1$ | B1 B1 | Any indication of second transformation gets 0 |
| | (b) | Rotation (only) 90° clockwise oe (3, 1) | B1 B1 B1 | Any indication of second transformation gets 0 |
| | (c) | Δ at (3, -4), (-1, -4), (-1, 2) | 2 | B1 for any enlargement scale factor 2 with correct orientation or any enlargement centre (3, 6) [7] |

| Page 3 | Mark Scheme: Teachers' version | Syllabus | Paper |
|--------|--------------------------------|----------|-------|
| | IGCSE – May/June 2012 | 0607 | 33 |

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|---|---------|---|--------|---|------|
| 5 | (a) | 9.26 (9.263 to 9.264) | 2 | M1 for $400 \div 43.18$ | |
| | (b) (i) | 338 or 339 (338.4 to 338.6) | 2 | M1 for $2 \times 75 + 2 \times \pi \times 30$ | |
| | (ii) | $r = \frac{D - 2s}{2\pi}$ oe | 2 | M1 for correct re-arrangement M1 for correct division by 2π | |
| | (iii) | $\frac{400 - 2 \times 85}{2 \times \pi}$ | 1 | answer given | [7] |
| 6 | (a) |  | 2 | Good curve with minimum point. -1 for poor curve e.g. y intercept $\neq 0$ either x intercepts $\neq 0$ (or both) too symmetrical | |
| | (b) | (1.38, -2.35) (1.379..., 2.345 to 2.346) | 1, 1 | SC1 for (1.4, -2.3) | |
| | (c) | $y = 4x - 5$ drawn and ruled | D2 | B1 for positive gradient and y intercept < 0 B1 cuts curve twice | |
| | (d) | 0.833 (0.8330...) 2.69 (2.690...) | 1 1 | SC1 for 0.83 and 2.7 | [8] |
| 7 | (a) (i) | 9.22 (9.219 to 9.220) | 3 | M2 for $\sqrt{11^2 - 6^2}$ or M1 for $h^2 + 6^2 = 11^2$ oe | |
| | (ii) | 348 or 347 (347.3 to 347.7...) | 2ft | M1 for $\frac{1}{3} \times \pi \times 6^2 \times$ their (a)(i) | |
| | (b) (i) | 207 (207.2 to 207.4) | 2 | M1 for $\pi \times 6 \times 11$ | |
| | (ii) | 433 or 434 (433.0 to 433.7) | 3ft | M2 for $2 \times \pi \times 6^2 +$ their 207 or M1 for $4(\text{or } 2) \times \pi \times 6^2$ | [10] |

| Page 4 | Mark Scheme: Teachers' version | Syllabus | Paper |
|--------|--------------------------------|----------|-------|
| | IGCSE – May/June 2012 | 0607 | 33 |

| | | |
|--|---|--|
| <p>8 (a) (i)</p>  <p>(ii) $(-3, 0)$</p> <p>(iii) $(0, -1.5)$</p> <p>(iv) $x = 2$ $y = 1$</p> <p>(b) (i)</p>  <p>(ii) Translation (only) $\begin{pmatrix} -3 \\ 0 \end{pmatrix}$</p> | <p>2</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> | <p>B1 Good curve with two branches. B1 top branch not crossing x-axis and bottom branch crossing both axes penalty of 1 if branches joined</p> <p>If 0 scored, SC1 for $y = 2$ and $x = 1$</p> <p>Parabola with min point approx $(-3, 0)$</p> <p>Any indication of second transformation gets 0</p> <p>[9]</p> |
| <p>9 (a) (i)</p> <p>(ii)</p> <p>(b) (i)</p> <p>(ii)</p> | <p>7.52 (7.517 to 7.518)</p> <p>2.74 (2.736...)</p> <p>12.52 (12.51 to 12.52), 8.74 (8.736...)</p> <p>(0)55.1 (55.06 to 55.1) or (0)55 but not without working</p> | <p>2</p> <p>2</p> <p>1ft</p> <p>3</p> <p>M1 for $8 \cos 20$ oe</p> <p>M1 for $8 \sin 20$ oe If 0 scored SC2 for reversed answers</p> <p>ft their (a) + 5, their (b) + 6</p> <p>M2 for $\tan \theta =$ their $\frac{12.52}{8.74}$ or M1 for $\tan \theta =$ their $\frac{8.74}{12.52}$ + M1 for $90 - \theta$</p> <p>[8]</p> |

| Page 5 | Mark Scheme: Teachers' version | Syllabus | Paper |
|--------|--------------------------------|----------|-------|
| | IGCSE – May/June 2012 | 0607 | 33 |

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|-----------|----------------|--|-------------|--|--|
| 10 | (a) | 3 points plotted correctly | 2 | ± small square, B1 for 2 correct | |
| | (b) | Negative | 1 | | |
| | (c) | 19.2 | 1 | | |
| | (d) | (their 19.2, 67.2) plotted | 1ft | | |
| | (e) | ruled line drawn through there (<i>d</i> , <i>t</i>) | 1 | | must have –ve gradient and at least 3 points on either side. |
| | (f) | strict ft read from their line at 36 | 1 | | [7] |
| 11 | (a) (i) | 27, 31 | 1, 1 | B1 for $4n$ or $kn + 3$ seen | |
| | (ii) | $4n + 3$ | 2 | | |
| | (b) | n^2 | 1 | | |
| | (c) (i) | 63 | 1 | | |
| | (ii) | $n^2 + 4n + 3$ oe ft | 1ft | | e.g. $(n + 2)^2 - 1$ ft their (b) + their (a)(i) [7] |
| 12 | (a) (i) | 20° | 2 | B1 for angle $BOA = 124$ or M1 for $56 - 36$ | |
| | (ii) | 36° | 1 | | |
| | (iii) | 50° | 1 | | |
| | (iv) | 30° | 1ft | | ft $50 -$ their (a)(i) |
| | (b) | 5.7 cm | 2 | | M1 for $\frac{8.1}{5.4} = \frac{CO}{3.8}$ oe [7] |