

**MARK SCHEME for the May/June 2011 question paper
for the guidance of teachers**

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/41

Paper 4 (Extended), maximum raw mark 120

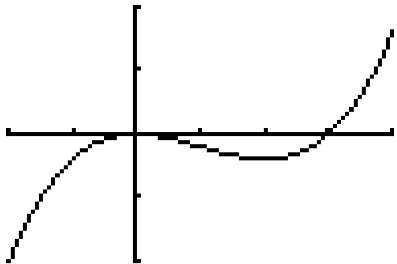
This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, 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.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

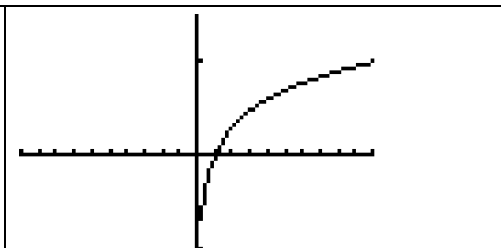
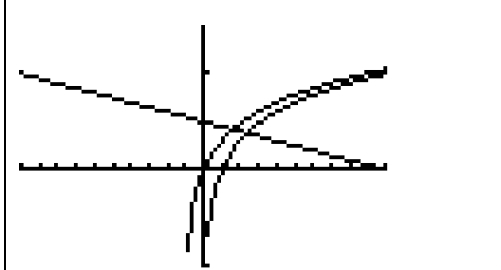
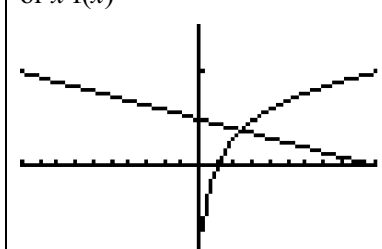
Cambridge is publishing the mark schemes for the May/June 2011 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

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| Page 2 | Mark Scheme: Teachers' version | Syllabus |
| | IGCSE – May/June 2011 | 0607 |

| | | | | |
|----------|----------------|--|-------------|---|
| 1 | (a) | 11.1(1....) | B3 | If B0, M2 for $(28 - 25.2) \div 25.2 (\times 100)$ M1 for $28 - 25.2$ or $\frac{28}{25.2}$ soi |
| | (b) | 21 | B3 | If B0, M2 for $25.2 \div 1.2$ oe M1 for $120\% = 25.2$ |
| | (c) (i) | 34.7 (34.72 to 34.76) final answer | B3 | If B0, M2 for 30×1.05^3 oe M1 for $30 \times 1.05^n, n > 1$ o.e. SC2 for 4.7 or 4.72 to 4.76 or 34.7 or 34.72 to 34.76 seen |
| | (ii) | 5.8 to 5.9 or 6 www 2 | B2 | If B0, M1 for multiplying 30 by 1.05 more than 3 times or dividing 40 by 1.05 more than 3 times or $30 \times 1.05^n = 40$ oe SC1 for 5 [11] |
| 2 | (a) |  | B3 | B1 for cubic with max then min B1 for x-intercept 3, (between 2 and 4) B1 for max at origin, 2mm accuracy |
| | (b) | 0, 3 | B1 | |
| | (c) | (0, 0) or (2, -4) | B2 | B1 for one correct and one incorrect [6] |
| 3 | (a) (i) | Rotation, (0, 0) 90° clockwise oe | B1 B1 B1 | All independent |
| | (ii) | Reflection, $y = -x$ oe | B1 B1 | Independent |
| | (b) (i) | Triangle vertices (-5, 3), (-2, 3), (-2, 5) | B2 | SC1 translation $\begin{pmatrix} -6 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ 2 \end{pmatrix}$ |
| | (ii) | Triangle vertices (1.5, 1), (6, 1), (6, 3) | B2 | 2mm accuracy for 1.5 SC1 for stretch of P with s.f 1.5 and invariant line $x = k$ or stretch of P s.f. 1.5 with x-axis invariant. [9] |
| 4 | (a) (i) | 60 | B1 | |
| | (ii) | 135 | B2 | If B0, M1 for $(5 - 2) \times 180 - (120 + \text{their } 60 + 140 + 85)$ soi by $195 - \text{their (i)}$ oe |
| | (iii) | 110 | B1 | |
| | (b) (i) | 75 | B1 | |
| | (ii) | 105 ft | B1 ft | ft 180 - their (b)(i) only if +ve. Can recover to correct answer [6] |

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| 5 (a) | -4 | B2 | Condone (-4, 9) M1 for $\frac{3}{6} = \frac{h}{8}$ oe (with + or -) or for $y = -\frac{3}{4}x + 6$ implied by answer 4 oe |
| (b) | $y = \frac{4}{3}x - \frac{7}{3}$ or other simplified equation | B4 | isw if equation seen and spoiled If B0, B1 for gradient = $\frac{4}{3}$, B1 for (4, 3) seen and M1 for correct use of any linear equation form with their $\frac{4}{3}$ or their (4, 3) [6] |
| 6 (a) (i) | 29.6 (0....) | M1 A1 | M1 for $0.5 \times 9 \times 7 \times \sin 110$ SC1 for 29.6... ww |
| (ii) | $9^2 + 7^2 - 2 \times 9 \times 7 \cos 110$ 13.2 (13.15 to 13.16) | M1 A2 | If A0, A1 for 173 or 173.1 or 173.09..... SC2 for 13.2 (13.15 to 13.16) ww |
| (iii) | 120 | B2 | B1 for 60 or 130 or 50 and 70 (with BA extended) seen at A in correct positions |
| (b) | $\sqrt{4^2 + 7^2}$ $(\sin R) = \frac{\sin 75}{11} \times \text{their } \sqrt{65}$ 45.1 (45.05 – 45.07) cao www 5 | M2 M2 A1 | soi by $\sqrt{65}$ or 8.06 or 8.062.... (M1 for $4^2 + 7^2$ soi by 65) (M1 for $\frac{\sin R}{\text{their } \sqrt{65}} = \frac{\sin 75}{11}$) [12] |
| 7 (a) | Points at (70, 14), (20, 70), (44, 46) and (50, 50) | P2 | Points touching correct corners. P1 for 3 points |
| (b) | Negative | B1 | |
| (c) | $-1.14c + 96.8$ (-1.142... and 96.82 to 96.83) | B2 | B1 $-1.14c + k$ or $mc + 96.8$ (-1.142... and 96.82 to 96.83) If B0, SC1 if -1.1 and 97 Allow x for c |
| (d) | 20 or 21 ft | B1ft | ft their equation only if answer is positive integer [6] |
| 8 (a) | 9 | B2 | If B0, M1 for $12 \times 6 \div 8$ oe |
| (b) | 232.(0.....) | B3 | If B0, M2 for $550 \times (6 \div 8)^3$ oe (M1 for $(\frac{6}{8} \text{ oe})^3$ or $(\frac{8}{6} \text{ oe})^3$) |
| (c) | 0.55 | B1 | [6] |

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| <p>9 (a) (i)</p>  <p>(ii) (1, 0)</p> <p>(iii) $x = 0$</p> <p>(iv) $f(x) \leq 1$</p> <p>(b) 2.4(0) (2.399...)</p> <p>(c) $0 \leq g(x) \leq 1$</p> <p>(d)</p>  | | <p>B2</p> <p>B1</p> <p>B1</p> <p>B2</p> <p>B2</p> <p>B1B1</p> <p>B1 ft B1</p> | <p>B1 for shape B1 for approaching y-axis in 4th quadrant</p> <p>If k to 1, allow B1. Allow in words. Allow y or x $f(x)$</p>  <p>If B0, M1 for line added to sketch (negative gradient, positive y-intercept, may be freehand) must cross curve. Pen – 1 if y-coord given</p> <p>Allow in words. Allow y or $f(x)$ or x for $g(x)$. SC1 for $0 < g(x) < 1$</p> <p>Shape correct translated to left of their original curve ft B1 for passing through origin Condone if stops at origin</p> <p>[12]</p> |
| <p>10 (a) (i)</p> <p>(ii)</p> <p>(b) (i)</p> <p>(ii)</p> | <p>22 600 (22608 to 22623)</p> <p>5.43 (5.425 to 5.429...) ft</p> <p>351 600 to 352 000</p> <p>$\div 8$ $\div 60$ $\div 60$ 12 h 12 or 13 min cao final answer www 4</p> | <p>B2</p> <p>B3 ft</p> <p>B2</p> <p>M1 M1 M1 A1</p> | <p>If B0, M1 for $\pi \times 80 \times 70$ (17584 to 17595.2) Allow 7200π</p> <p>If B0, M1 for $\div 100^2$ and M1 for $\times 2.40$ (M's independent) ft their (i) $\div 100^2 \times 2.40$</p> <p>If B0, M1 for $\pi \times 40^2 \times 70$ Allow 112000π</p> <p>(43 950 to 44 000) (732.5 to 733.3...) (12.20 to 12.22...) or 12 remainder 12.48 to 13.33. ($8 \times 60 \times 60 = 28800$)</p> <p>[11]</p> |

Throughout question 11, do not allow ratios or words.

If decimals or percentages used, usual accuracy applies except penalise two sf by – 1 only once. isw and cancelling/converting to decimal or %

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| 11 (a) (i) | $\frac{2}{7}$ oe | B1 | 0.286 (0.2857....) |
| (ii) | 7 | B1 | Ignore embellishments |
| (b) (i) | $\frac{1}{6}$ | B1 | |
| (ii) | $\frac{5}{7}, \frac{1}{6}, \frac{5}{6}, \frac{2}{6}, \frac{4}{6}$ oe | B2 | B1 for 3 or 4 correct |
| (iii) | $\frac{2}{42}$ oe | B2 | 0.0476 (0.04761 to 0.04762) If B0, M1 for their $\frac{2}{7} \times$ their $\frac{1}{6}$ |
| (iv) | $\frac{20}{42}$ oe | B3 | 0.476 (0.4761 to 0.4762) If B0, M2 for their $\frac{2}{7} \times$ their $\frac{5}{6} +$ their $\frac{5}{7} \times$ their $\frac{2}{6}$ M1 for one of the products |
| (c) | $\frac{40}{210}$ oe | B2 | 0.19(0) (0.1904 to 0.1905) If B0, M1 for $\frac{5}{7} \times \frac{4}{6} \times \frac{2}{5}$ [12] |
| 12 (a) | 120, 90, 180 | B1B1B1 | |
| (b) | 58.75 ft | B2 ft | Accept 58.7 or 58.8 ft their frequencies with correct mid-values If B0, M1 for at least two correct mid-values seen |
| (c) | 180, 290, 380 ft | B2 ft | B1 for 2 correct ft their (a) |
| (d) | (30, 60), (50, 180), (60, 290), (70, 380), (100, 560) ft | P2 ft C1 | Points touching lines P1 for 3 or 4 correct ft Smooth curve through these 5 points (0.5 square accuracy) and correct shape |
| (e) (i) | $58 \leq med < 60$ ft | B1 ft | In all parts of (e) ft their graph but only if it is cumulative |
| (ii) | 43 to 46 ft | B1 ft | |
| (iii) | 29 to 36 ft | B1 ft | ft is upper quartile – their (ii) |
| (iv) | 440 to 460 ft | B2 ft | If B0, SC1ft for 100 to 120 (may be on graph) If use 600 in all 4 parts mark on ft basis but deduct 2 marks [15] |

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| 13 (a) | $0.5(x+2)(x+1) = x^2$ or $(x+2)(x+1) = 2x^2$ $x^2 + 2x + x + 2$ oe seen $x^2 - 3x - 2 = 0$ | M1 | Must be one of these two forms |
| | | B1 | Independent oe includes $\frac{1}{2}x^2 + x + \frac{1}{2}x + 1$ |
| | | E1 | At least one intermediate line after the M1 and no errors or omissions |
| (b) | | M1 | M1 for sketch of parabola with a zero either side of origin or formula correctly used $\frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-2)}}{2(1)}$ or better |
| | -0.56, 3.56 | A1A1 | If M0 or other GDC applications, SC2 for -0.56 and 3.56 If M0 or M1, SC1 for -0.6 and 3.6 or -0.561 to -0.562 and 3.561 to 3.562 |
| (c) | 39.15 to 39.60.. ft | B2 ft | ft a positive root. If B0, M1 for $\tan = ((\text{their root} + 1) / (\text{their root} + 2))$ [8] |