

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

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/32

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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1	<p>(a) 3 : 5</p> <p>(b) 12</p> <p>(c) 9, 21</p> <p>(d) $\frac{2}{y}$</p> <p>(e) 210</p> <p>(f) 9</p> <p>(g) 50</p>	<p>B1</p> <p>B1</p> <p>B1 B1</p> <p>B2</p> <p>B1</p> <p>B2</p> <p>B2</p>	<p>If B0, M1 for $30 \div 10$ seen (not implied by 3) Condone 21, 9</p> <p>B1 for 2 and x's cancelled B1 independent for denominator y</p> <p>If B0, M1 for 0.15×60 oe</p> <p>If B0, M1 for $6 \div 3$ (implied by 2) seen [11]</p>
2	<p>(a) (i) 33</p> <p>(ii) 35.5</p> <p>(iii) 6</p> <p>(iv) 37</p> <p>(v) 35.1</p> <p>(b) Correct values on shoe axis</p> <p>Six correct heights (1, 3, ..., 1, 2, 1, 2)</p> <p>(c) Angles of 72°, 36° and $72^\circ (\pm 2^\circ)$ 3 correct labels of shoe sizes ft</p> <p>(d) (i) 0.3 oe ft</p> <p>(ii) 1 oe</p> <p>(e) $66\frac{2}{3}$ or $66.\dot{6}$ or 66.7 (or 66.66 to 66.67) ft</p>	<p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>B2</p> <p>B2 ft</p> <p>B1 ft</p> <p>B1 ft</p> <p>B1</p> <p>B2 ft</p>	<p>i.e. labels not attached to grid lines. Condone absence of 34. B1 for five correct heights</p> <p>B1 for 1 correct ft their (b) ft their (b)</p> <p>ft their (b) or correct</p> <p>Allow $\frac{10}{10}$ etc</p> <p>Accept 67. If B0, M1 for $6 \div 9$ soi ft their (b) [15]</p>
3	<p>(a)</p> <div style="text-align: center;"> </div> <p>(b) (i) 2, 4, 6 ft</p> <p>(ii) 1, 2, 3, 4, 6, 8, 9, 10 ft</p> <p>(iii) 1, 3, 9 ft</p> <p>(iv) 4 ft</p>	<p>B3</p> <p>B1 ft</p> <p>B1 ft</p> <p>B1 ft</p> <p>B1 ft</p>	<p>B2 for 9 correct, B1 for 8 correct</p> <p>[7]</p>
4	<p>(a) 46.2 (46.23 to 46.24)</p> <p>(b) 12.3 (12.31 to 12.32)</p>	<p>B2</p> <p>B2</p>	<p>If B0, M1 for $\sin = \frac{6.5}{9}$ oe</p> <p>If B0, M1 for $\tan 57 = \frac{TW}{8}$ oe or better [4]</p>

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5	(a) (i) 18 (ii) 28.3 (28.26 to 28.28) (iii) 10.3 (10.26 to 10.28) ft (b) (i) 8.49 (8.485....) (ii) 17.9 (17.90 to 17.92) ft	B2 B2 B1 ft B2 B3 ft	If B0, M1 for $0.5 \times 6 \times 6$ soi If B0, M1 for $0.25 \times \pi \times r^2$ soi ft their (ii) – their (i) If B0, M1 for $6^2 + 6^2$ ft 9.42 to 9.43 + their (i) If B0, M1 for $0.25 \times \pi \times 2r$ then M1 (dependent) for adding (i)	[10]
6	(a) (i) 80 (ii) Alternate or Z or diagram showing Z (b) (i) 100 (ii) 50 (iii) 50	B1 B1 B1 B1 B1		[5]
7	(a) (3, -4) (b) $\begin{pmatrix} -3 \\ 5 \end{pmatrix}$ (c) (i) $\frac{2}{3}$ (ii) $y = \frac{2}{3}x + 1$ oe ft	B1 B1 B2 B2 ft	If B0, M1 for evidence of $\frac{\text{rise}}{\text{run}}$ Must be full equation ft their (c) If $y = mx + c$ then B1 for $\frac{2}{3}x$ and B1 (indep) for + 1 If $ax + by = c$ oe, B2 for a, b, c B1 for 2 of them correct SC1 for $\frac{2}{3}x + 1$	[6]
8	(a) Reasonable rectangular hyperbola shape Not touching x -axis $x = 3$ approximately looking an asymptote (b) (i) Vertical asymptote drawn for their curve (ii) $x = 3$ cao (c) (i) U-shaped parabola, vertex at origin (ii) 4.16 (or 4.157...)	C1 B1 B1 B1 B1 B1	Condone slight curving inwards from asymptotes Independent Independent and fairly generous Must look an asymptote but can be freehand If graph is $\frac{10}{x} - 3$ ft as follows (a) C1, B0, B0 (b)(i) y-axis with some extra indication it is an asymptote B1 (ii) $x = 0$ B1 (c) (i) B1 (ii) 2 B1	[7]

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9	(a) (i)	1808 to 1810	B2	If B0, M1 for $\pi \times 6^2 \times 16$
	(ii)	1.808 to 1.81 ft	B1 ft	
(b)	(i)	13.3 (13.26 – 13.27)	B2	If B0, M1 for $\pi \times 6^2 \times h = 1500$ o.e.
	(ii)	6	B2	If B0, SC1 for figs 6 [7]
10	(a)	$-2 \leq x < 1$ or $x \geq -2$ and $x < 1$	B1 B1	SC1 for $-2 < x \leq 1$
	(b)	$x = 1.5, y = -2$	M1 A2	M1 for eliminating one variable to equation $kx = l$ or $ky = l$ or for sketch of both lines, one positive gradient, one negative gradient and intersection in bottom right quadrant (can be freehand) trial and improvement both correct 3 (one correct 0) ww or other GDC applications both correct SC2 (one correct 0)
(c)	(i)	$r(\pi + 2)$	B1	
	(ii)	$\frac{P}{\pi + 2}$ cao	B1	[7]

**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**

11	(a)	12	B1	
	(b) (i)	$\frac{4}{7}, \frac{4}{7}, \frac{3}{7}, \frac{4}{7}$ against relevant branches	B2	B1 for 2 or 3 correct
		(ii)	$\frac{9}{49}$ oe	B2
	(iii)	$\frac{24}{49}$ oe	B3	(0.49(0) or 0.4897 to 0.4898) If B0, M2 for $\frac{3}{7} \times \frac{4}{7} + \frac{4}{7} \times \frac{3}{7}$ o.e M1 for one of the products (0.24489...)
(iv)	It does not rain (on either day) oe	B1	[9]	
12	(a)	50.8	B2	If B0, M1 for at least 3 correct mid-values seen, not all from middle four
	(b) (i)	45, 80	B1 B1	
		(ii)	(50, 45) and (60, 80) ft plotted Curve completed through 2 plotted points ft	P1 ft C1 ft
(iii)	14 to 16 ft	B2 ft	B1 for one correct quartile seen (42 to 44 or 57 to 59) ft their curve but only if curve increasing [8]	