UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

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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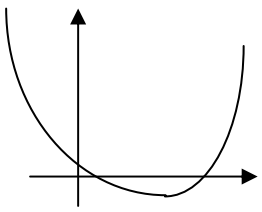
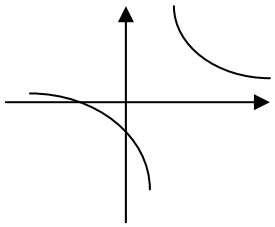
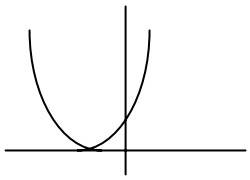
1	**(a)**	11 15	**2**	**B1** for 11:50 or 3hrs 5 mins seen
	(b)	17 50	**2**	**B1** for 21:50 or 10:20 seen
	(c)	8192	**3**	**M2** for (4 × 1600) × 1.28 oe or **M1** for 1600 × 1.28 oe **A1** for 2048
	(d)	545.45	**2**	**M1** for 3000 ÷ 5.50, implied by 545 or 545.5 or 545.45…. **[9]**
2	**(a) (i)**	0.2 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 ½ × 15 × 8, **M1** for ½ × 10 × 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]**

5	**(a)**	9.26 (9.263 to 9.264)	**2**	**M1** for 400 ÷ 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 $\varnothing$ 0 either x intercepts $\varnothing$ 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(or 2) $\times \pi \times 6^2$ **[10]**

8	(a) (i)		2	**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
	(ii)	(– 3, 0)	1	
	(iii)	(0, –1.5)	1	
	(iv)	$x = 2$ $y = 1$	1 1	If 0 scored, **SC1** for $y = 2$ and $x = 1$
	(b) (i)		1	Parabola with min point approx (–3, 0)
	(ii)	Translation (only) $\begin{pmatrix} -3 \\ 0 \end{pmatrix}$	1 1	Any indication of second transformation gets 0 **[9]**
9	(a) (i)	7.52 (7.517 to 7.518)	2	**M1** for 8 cos 20 oe
	(ii)	2.74 (2.736…)	2	**M1** for 8 sin 20 oe If 0 scored **SC2** for reversed answers
	(b) (i)	12.52 (12.51 to 12.52), 8.74 (8.736...)	1ft	ft their **(a)** + 5, their **(b)** + 6
	(ii)	(0)55.1 (55.06 to 55.1) or (0)55 **but not without working**	3	**M2** for $\tan\theta =$ their $\frac{12.52}{8.74}$ or **M1** for $\tan\theta =$ their $\frac{8.74}{12.52}$ + **M1** for $90 - \theta$ **[8]**

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 (d, t)	**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**	
	(ii)	$4n + 3$	**2**	**B1** for $4n$ or $kn + 3$ seen
	(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]**