MARK SCHEME for the May/June 2012 question paper

for the guidance of teachers

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/31   Paper 3 (Core), maximum raw mark 96

1	(a)		A, B, C, D, K, L, M	1	
	(b)		6	1	
	(c)		10%	2	M1 for 2/20 seen
	(d)		$\frac{5}{20}$ oe isw any cancelling or converting	1	
	(e)		$\frac{6}{13}$ o.e isw any cancelling or converting (0.462 or 0.4615...)	1	**[6]**

2	(a)	(i)	$7000 \div 100$ $\times 33$	**M1** **M1**	or **M1** for 2310 and $7000 \div 70$ **seen** o.e (allow 231 and $700 \div 7$) **then** M1 ratio 33 : 100
		(ii)	Mr Ray $2450, Dr Surd $2240	**B1 B1**	
	(b)		105	1	
	(c)		920 ft	1ft	*their* 2240 – 1320, ft positive answers only
	(d)		1715 ft	2ft	**M1** for 70/100 × *their* 2450 oe **[8]**

3	(a)		$x = -1$, $y = 2$ with working	3	**M1** for attempt to get 2 equations for elimination. Condone one numerical slip. OR **M1** for equations in the form $y =$ or $x =$. Condone one numerical slip. OR **M1** for sketch. **A1** each answer Trial and improvement with **both** answers correct scores 3, otherwise 0. **SC1 for correct answers without working**
	(b)	(i)	$2\pi r(r + h)$ final answer	2	**M1** for any correct partial factorisation or $2\pi r(\ )$
		(ii)	$h = \dfrac{s - 2\pi r^2}{2\pi r}$ oe final answer	2	**M1** for correct re-arrangement seen **M1** for correct division by $2\pi r$ seen
	(c)		$6x^3$	2	**B1** for kx^3 or $6x^k$ **[9]**
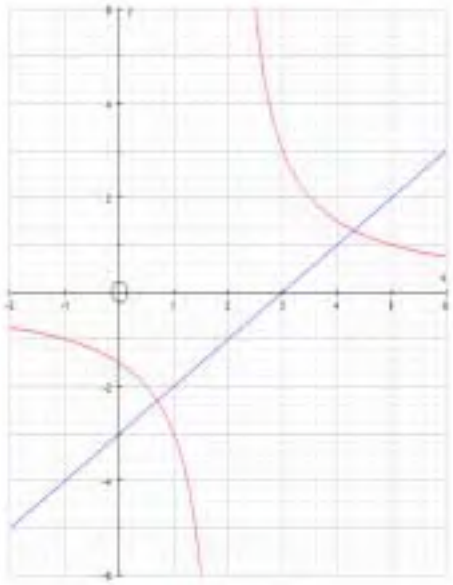
4	(a)		Points plotted correctly	B1B1	
	(b)		(3, 5)	1	
	(c)		$\begin{pmatrix} 2 \\ 4 \end{pmatrix}$	1	condone poor notation
	(d)		2 oe	2	**M1** for change in y over change in x. Allow 4/2
	(e)		2 ft	1ft	ft **(d)** only
	(f)		$y = 2x - 7$ oe	2ft	**M1** for $y = their\ 2x + c$ or for substituting (5, 3) into formula [9]
5	(a)	(i)	24	1	
		(ii)	56 – 57 kg	1	
		(iii)	9 (allow +/– 0.5) www	2	**M1** for 59 (+/– 0.5) or 50 to 51 seen
	(b)		$\dfrac{8}{24}$ or $\dfrac{9}{24}$ oe ft	2ft	**M1** for 8 or 9 seen ft from **(a)** [6]
6	(a)	(i)	trapezium	1	
		(ii)	51	1	
		(iii)	82	1	
		(iv)	129	1	
	(b)		108	3	**M2** for 540/5 seen or 180 – 360/5 **M1** for $(5 - 2) \times 180$ oe or 360/5 [7]

7	(a)	(i)	90	1	
		(ii)	90	1	
		(iii)	110	1	
	(b)		10.2 (accept 10.17 – 10.18)	2	Allow 2 for other arc = 23.1 or 23.11 – 23 13… **M1** for 110/360 × 2π × 5.3 or 250/360 × 2π × 5.3
	(c)		6.08 (accept 6.079 – 6.080)	2	**M1** for sin35 = CB/10.6 oe (i.e. all steps, apart from final one) **[7]**
8	(a)	(i)	6	1	
		(ii)	108	2ft	**M1** for full perimeter seen
	(b)		571 or 571.2	2	**M1** for 30 × 18 **[5]**
9	(a)		46(.0) (accept 45.95 – 46.0)	2	**M1** for $\frac{2}{3} \times \pi \times 2.8^3$ or $\frac{4}{3} \times \pi \times 2.8^3$
	(b)		49.2 or 49.3 (accept 49.23 – 49.27)	2	**M1** for using $2\pi 2.8^2$ or $4\pi 2.8^2$
	(c)		10.2 (accept 10.19…)	2	**M1** for $9.8^2 + 2.8^2$
	(d)		89.6 or 89.7 (accept 89.59 – 89.74)	2 ft	**M1** for $\pi \times 2.8 \times$ their 10.2 ft their **(c)**
	(e)		7	2	**M1** for $\frac{2}{2.8}$ or $\frac{2.8}{2}$ or $\frac{9.8}{2.8}$ **[10]**
10	(a)		Diagram	**B1B1**	1 mark for roughly the correct shape 1 **indep** mark for the information (at least 3 out of 4 correct)
	(b)		(0)51.8 accept (0)52 but only with working	4	**M1** for recognizing the 90 angle – may be marked on diagram. **M1** for tan = $\frac{80}{200}$ or better (first **M1** is implied) 21.8 seen implies first 2 M's **M1** for adding 30. **[6]**

11	(a)		**3**	**B1** for cubic shape with a max and a min **B1** for turning points in the correct quadrants. **B1** for *x*-axis intercepts: one negative, one positive and one at origin.
	(b)	(–2, 1) and (1, –0.35)	**B1 B1**	**SC1** for correct points in wrong order
	(c)	x = 0, 1.81 (1.811 to 1.812)	**B1 B1**	
	(d)	their graph moved up 3	**1**	their graph with vertical translation of 3 [8]
12	(a)	3820 (accept 3817…)	**1**	
	(b)	3800	**1**	
	(c)	$\dfrac{3}{7}$	**2**	**M1** for 15/35
	(d) (i)	Positive	**1**	
	(ii)	Ruled line drawn through (180, their 3820)	**2 ft**	**B1** for passing through mean, **B1** for positive gradient.
	(iii)	3300 – 3500	**1**	[8]

13	(a)		**2**	**B1** for reasonable shape with each part of graph in approximately the correct place. One branch above and one branch below x-axis Top branch not touching y-axis Bottom branch cutting y-axis Penalty of 1 if branches connected.
	(b)	$x = 2,\ y = 0$	**B1 B1** **ft**	ft $\dfrac{3}{x} - 2$ only $x = 0,\ y = -2$
	(c)	Line on graph	**1**	Ruled line must have positive gradient and negative y-intercept
	(d)	$(0.697, -2.3(0))$ $(0.6972…., -2.303 \text{ to } -2.302)$, $(4.3(0), 1.3(0))$ $(4.302 \text{ to } 4.303, 1.302 \text{ to } 1.303)$	**B1** **B1**	ft $\dfrac{3}{x} - 2$ only $(-1.3(0), -4.3(0))$ $(-1.303 \text{ to } -1.302, -4.303 \text{ to } -4.302)$ $(2.3(0), -0.697)$ $(2.302 \text{ to } 2.303, -0.6972…)$ **[7]**