MARK SCHEME for the May/June 2009 question paper

for the guidance of teachers

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/03 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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CIE is publishing the mark schemes for the May/June 2009 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

M marks are given for a correct method.

A marks are given for an accurate answer following a correct method.

B marks are given for a correct statement or step.

D marks are given for a clear and appropriately accurate drawing.

P marks are given for accurate plotting of points.

E marks are given for correctly explaining or establishing a given result.

Abbreviations

cao   correct answer only

cso   correct solution only

ft   follow through
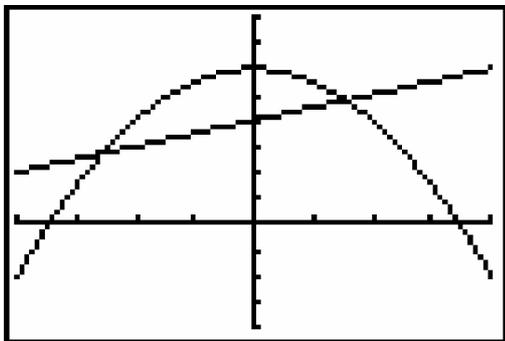
oe   or equivalent

soi   seen or implied

ww   without working

www   without wrong working

1	(a)	(i)	55	B1	
		(ii)	7	B1	
		(iii)	11	B1	
	(b)	(i)	82	B1	
		(ii)	38	B1	
	(c)		$\frac{89}{100}$ oe	B1	
	(d)		1780 ft	B1	ft their **(c)** × 2000 **[7]**

2	(a)	(i)	7	B1	
		(ii)	7.5	B1	
		(iii)	7.9	B1	
		(iv)	3	B1	
		(v)	9	B1	
	(b)		Radius drawn giving angles of 72° and 36° ±2° Labels 9 and 10 correctly placed	B1 B1	Must be ruled If 2 sectors and 9 is larger
	(c)		Ruled bars of heights 5, 2, 2, 1	B3	**B2** for 3 correct, **B1** for 2 correct. Deduct 1 for freehand but reasonable
	(d)		30	B2	If **B0**, **M1** for 3 ÷ 10 × 100 oe **[12]**

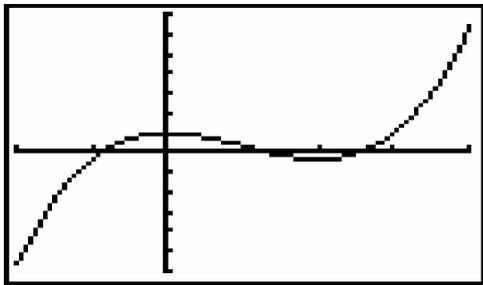| 3	(a)	150	**B2**	If **B0**, **M1** for $180 \div 6 \times 5$
	(b)	$121 \div 11$ oe $\times 6$ oe	**M1** **M1**	Accept $6 \times 11 = 66$, $5 \times 11 = 55$ **M1** $55 + 66 = 121$ **M1**
	(c)	4.76 (4.761 – 4.762))	**B2**	If **B0**, **M1** for $3 \div 63 \times 100$ oe
	(d)	63×1000 6.3×10^4 www3	**M1** **A1A1**	**SC2** for 63×10^3 oe
	(e) (i)	14.3 (14.28 – 14.29)	**B2**	**M1** for $100 \div 7$
	(ii)	6.9(0) (6.896 – 6.897)	**B2**	If **B0**, **M1** for $100 \div 14.5$ **[13]**

4	(a)	 $y = \frac{x}{2} + 2$ drawn	**B1** **B1**	For approx straight line with grad approx $\frac{1}{2}$, reaching curve twice For approx straight line with y-intercept approx 2, also reaching curve twice
	(b)	– 1.2808, 0.7808	**B1B1**	Accept 2dp (–1.28 and 0.78) or better – 1.281 to –1.280 , 0.781 or 0.7807 to 0.7808 **SC1** – 1.3, 0.8
	(c)	Line would **not meet** the curve even if extended oe	**B1**	**[5]**

5	(a)	42	**B2**	If **B0**, **M1** for $0.5 \times 12 \times 7$
	(b)	63	**B2**	If **B0**, **M1** for $0.5 \times 6 \times 7 +$ their 42 oe
	(c)	105	**B1**	
	(d)	35	**B1**	**[6]**

6	(a)		7 correct points	**P3**	**P2** for 5 or 6 correct, **P1** for 3 or 4
	(b)		Negative	**B1**	
	(c)	(i)	3	**B1**	
		(ii)	Straight line through (6, **their** 3) with **negative** gradient through (8, 0.5 to 1.5)	**M1** **A1**	Plotted or implied (within 2 mm of $(\bar{x}, \bar{y})$) **A0** if not ruled For 3 to 8 at least **[7]**

7	(a)	(i)	37.68 – 37.7	**B2**	If **B0**, **M1** for $\frac{1}{3} \times \pi \times 3^2 \times 4$ Accept 12π
		(ii)	283 (282.6 – 282.8) **ft**	**B2 ft**	If **B0**, **M1** for **(i)** × 7.5
	(b)	(i)	75.36 – 75.41	**B3**	If **B0**, **M1** for $\pi \times 3 \times 5$ **M1** for $\pi \times 3^2$ Accept 24π
		(ii)	0.007536 – 0.007541 **ft**	**B1 ft**	ft their **(i)**
		(iii)	928 cao	**B2**	If **B0**, **M1** for 7 ÷ their **(ii)** **[10]**

8	(a)	Cubic shape with max then min Cross *x*-axis 3 times 2 *x*-intercepts positive Max point close to (0, 1)	**B1** **B1** **B1** **B1**	At least from –2 to 4 Dependent on previous **B1** Dependent on first **B1**
	(b) (i)	1	**B1**	
	(ii)	3.04(3.041 – 3.042)	**B1**	
	(c)	–0.879, 1.35, 2.53 (–0.8794 to –0.8793, 1.347…, 2.532...)	**B1,B1, B1**	If **B0**, **SC2** for –0.88, 1.3, 2.5 or **SC1** for 2 of these. If **B1**, **SC1** for other two to 2 sf
	(d)	(2, –0.333)	**B1,B1**	Allow –0.33 or $-\frac{1}{3}$
	(e)	–1.43 (–1.426 to –1.425)	**B1**	
	(f)	–5.67 to 6.33 (–5.666 to – 5.667 to 6.3333..) oe	**B1, B1**	Allow –5.6 or –5.7 and 6.3 **[14]**

9	(a)	(i)	55	**B2**	**M1** for $\frac{1}{2}(180 - 70)$
		(ii)	110	**B2**	**M1** for 180–70 or for 360–90–90–70 soi (may be on diagram) or for 180 – 2[90 – their **(i)**] **ft**
	(b)		Diameter	**B1**	**[5]**

10	(a)	$x = 1$	**B1**	
	(b)	$-\frac{4}{7}$ oe –0.571 or –0.5714…	**B2**	**B1** for – ve, B1 for 4/7 Allow –0.57
	(c)	(4.5, 4)	**B1, B1**	
	(d)	$(\text{their } 4)^2 + (\text{their } 7)^2$ 8.06 (8.062…) ft www2	**M1ft** **A1ft**	ft from **(b)**
	(e)	$\tan(\text{angle}) = \frac{their\,4}{their\,7}$ oe 29.7 (29.74 – 29.75….) ft www2	**M1ft** **A1ft**	ft from **(b)** or **(d)** Radians 0.519 give **M1A1** **[9]**

11	(a)	$\frac{4}{5}$ cao	**B2**	If **B0**, **M1** for $\frac{2 \times 7}{5} - \frac{4}{2}$ implied by $\frac{8}{10}$ oe
	(b)	4, 5	**B1,B1**	May be embedded
	(c)	20	**B2**	If **B0**, **M1** for $\frac{2x}{5} = 8$ (Must reach correct equation with one variable term and one constant term only.)
	(d)	$\frac{y}{2} = \frac{2x}{5} - 1$ oe $y = 2\left(\frac{2x}{5} - 1\right)$ oe www 2 $\frac{4x}{5} - 2$, $\frac{4x - 10}{5}$	**M1** **M1**	for re-arranging correctly for + or $-\frac{y}{2}$ oe for multiplying by 2 correctly (any order) **Mark final answer** **[8]**