UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2008 question paper

0580 and 0581 MATHEMATICS

0580/21 and 0581/21   Paper 21 (Extended), maximum raw mark 70

UNIVERSITY *of* CAMBRIDGE
International Examinations
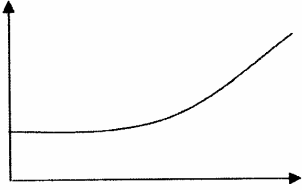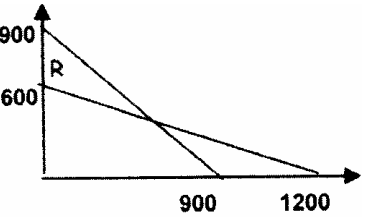
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Abbreviations

cao — correct answer only
ft — follow through after an error
oe — or equivalent
SC — Special Case
www — without wrong working

1	**(a)** 2	1	
	(b) 0	1	Allow none oe
2	$a = 3$ $b = 4$	2	**W1** one correct If no marks scored **M1** $(3 \times 2)(2 \times 4)$ oe
3	1.59(459…) or 59/37 or $1\frac{22}{37}$	2	**M1** $\frac{22}{37}$ or 0.5945… seen
4	**(a)** 2.67×10^{-2}	1	cao – must be correct notation
	(b) 0.0267(00…)	1ft	correct or ft
5	Correct locus	2	**M1** arc through D radius BD **A1** some indication that the arc is from D to D'
6	60 120	2	**W1** one correct Allow 60.00.. or 120.00.. or if **W0**, **SC1** the angles add up to 180°
7	50.1225 cao	2	**M1** 6.15 and 8.15 seen
8	$x^2(a + b)$ $(\pm) \sqrt{((p^2 + d^2)/(a + b))}$	1 2	**M1** 2 moves **completed** correctly
9	**(a)** $y = 2x - 4$	2	**W1** $2x + c$ **or** **W1** $mx - 4$
	(b) (2, 0)	1ft	For $y = 2x + k$ only, allow $(-k/2, 0)$
10	$x = 8$ $y = 5$	3	**M1** ×2 and add or ×3 and subtract **A1**
11	$\dfrac{-18}{(2x + 3)(x - 3)}$ oe	3	**W1** denominator correct in answer space (including any brackets) **M1** $4(x - 3) - 2(2x + 3)$ **A1** -18
12	$x > -0.16$ or $-0.16 < x$ or $x > -\dfrac{4}{25}$	3	**M1** 2 moves **completed** correctly **M1** 2 more moves **completed** correctly Final mark must be given for answer line

13	1.25	3	**M1** $p = k/(q + 2)^2$ or $p(q + 2)^2 = k$ **A1** $k = 125$	**M1** $p = (k/(q + 2))^2$ **A1** $k^2 = 125$ or $k = \sqrt{125}$

If no marks awarded
SC1 5 : $k/25$ in this form
           p : $k/100$ (colon optional)
or **SC1** for either
$5 = k/(3 + 2)^2$ or $5 = k/5^2$
Allow 5/4

14	**(a)** 45498 or 4.5498×10^4 cao	2	**M1** $2.656 \times 10^9 \div 58376$
	(b) 7240	2	**M1** $\dfrac{\textbf{(a)}}{2\pi} = (r)$

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15	(a)	0.5 or $\frac{1}{2}$	1	
	(b)	-1 or $-1.(00)$ cao www	2	**M1** cos180
	(c)	$\dfrac{\cos x - 4}{2}$ oe	2	**M1** subtracting 4 and then dividing by 2 seen e.g. $\dfrac{x-4}{2}$ or $\dfrac{y-4}{2}$ or $\dfrac{f(x)-4}{2}$
16	(a)	1000 1400 1960 2744 3842 (2740) (3840)	2	**W1** three correct 3 sf answers or better
	(b)		2	**P1**ft 4 or 5 plots correct or ft from their table **C1** smooth curve cao To half a small square
	(c)	3.2 or 3.3	1ft	If a curve and a line are drawn mark the curve cao or ft from their **(b)**
17	(a)	**(i)** $-3\mathbf{p} - 2\mathbf{q}$	1	allow $-(3\mathbf{p} + 2\mathbf{q})$
		(ii) $-3\mathbf{p} + 4\mathbf{q}$	1	allow $-(3\mathbf{p} - 4\mathbf{q})$
		(iii) $-4\mathbf{p}$	2	**M1 (ii)** $-(\mathbf{p} + 4\mathbf{q})$ or $BC - AC = BA$ or **(ii)** $- \mathbf{p} - 4\mathbf{q}$
	(b)	**8**	1	
18	(a)	1.05	2	**M1** clear attempt at y–step/x–step
	(b)	3360	3	**M1** attempting the area under the graph **W1** $\dfrac{(140+180)\times 21}{2}$ May be done by triangles and rectangles
	(c)	18.7	1ft	**(b)** / 180 evaluated correctly
19	(a)	53.4	3	**M1** $50/360 \times \pi \times 12^2$ or $30/360 \times \pi \times 6^2$ **M1** $50/360 \times \pi \times 12^2 - 30/360 \times \pi \times 6^2$
	(b)	49.6	3	**M1** $50/360 \times 2 \times \pi \times 12$ or $30/360 \times 2 \times \pi \times 6$ **M1** $12 + 6 + 12 + 6 +$ both their arcs
20	(a)	$600x + 1200y \geq 720000$	1	seen
	(b)	$x + y \leq 900$	1	
	(c)		4	**W1** drawing $x + y = 900$ **W1** drawing $x + 2y = 1200$ **W1** R is below $x + y = 900$ **W1** R is above $x + 2y = 1200$ The lines must be in the right place Accurate to one small square
	(d)	300	1ft	Correct or ft from their labelled R, accuracy ± 10 on the lowest y value in R
			70	