UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2008 question paper

0580 and 0581 MATHEMATICS

0580/22 and 0581/22 Paper 22 (Extended), maximum raw mark 70

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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

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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 **(b)** 0	1 1	 Allow none oe
2	$a = 4$ $b = 3$	 2	**W1** one correct If no marks scored **M1** $(4 \times 2)(2 \times 3)$ oe
3	1.59(459…) or 59/37 or $1\frac{22}{37}$	2	**M1** $\frac{22}{37}$ or 0.5945… seen
4	**(a)** 3.85×10^{-2} **(b)** 0.0385(00…)	1 1ft	cao – must be correct notation 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	45 135	 2	**W1** one correct Allow 45.. or 135.00.. or if **W0**, **SC1** the angles add up to 180°
7	15.8025 cao	2	**M1** 2.45 and 6.45 seen
8	$x^2(a + b)$ $(\pm)\sqrt{((p^2 + d^2)/(a + b))}$	1 2	 **M1** 2 moves **completed** correctly
9	**(a)** $y = 2x - 6$ **(b)** (3, 0)	2 1ft	**W1** $2x + c$ **or** **W1** $mx - 6$ For $y = 2x + k$ only, allow $(-k/2, 0)$
10	$x = 5$ $y = 2$	3	**M1** ×4, ×3 and add or ×3 and subtract **A1**
11	$\frac{-17}{(5x+1)(2x-3)}$ oe	3	**W1** denominator correct in answer space (including any brackets) **M1** $5(2x - 3) - 2(5x + 1)$ **A1** -17
12	$x > -0.16$ or $-0.16 < x$ or $x > -\frac{4}{25}$	3	**M1** 2 moves **completed** correctly **M1** 2 more moves **completed** correctly Final mark must be given for answer line
13	0.64 $\frac{16}{25}$	3	**M1** $p = k/(q + 2)^2$ or $p(q + 2)^2 = k$ **A1** $k = 64$ **M1** $p = (k/(q + 2))^2$ **A1** $k^2 = 64$ or $k = 8$ If no marks awarded **SC1** $4 : k/16$ in this form $p : k/100$ (colon optional) or **SC1** for either $4 = k/(2 + 2)^2$ or $4 = k/4^2$
14	**(a)** 45498 or 4.5498×10^4 cao **(b)** 7240	2 2	**M1** $2.656 \times 10^9 \div 58376$ **M1** $\frac{\textbf{(a)}}{2\pi} = (r)$

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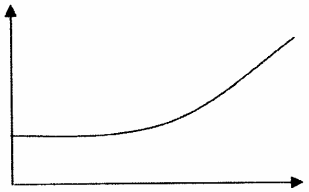
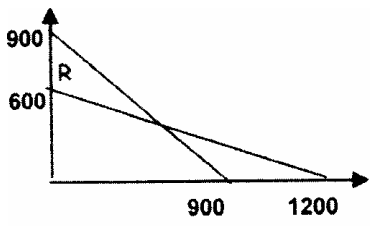
15	**(a)** 1	1	
	(b) 0	2	**M1** tan180
	(c) $\frac{\tan x - 6}{2}$ oe	2	**M1** subtracting 6 and then dividing by 2 seen e.g. $\frac{x-6}{2}$ or $\frac{y-6}{2}$ or $\frac{f(x)-6}{2}$
16	**(a)** 1000 1400 1960 2744 3842 (2740) (3840)	2	**W1** three correct 3 sf answers or better
	(b) 	2	**P1**ft 4 or 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)** $-3\mathbf{p} - \mathbf{q}$	1	allow $-(3\mathbf{p} + \mathbf{q})$
	(ii) $-4\mathbf{p} + 2\mathbf{q}$	1	allow $-(4\mathbf{p} - 2\mathbf{q})$ or $-2(2\mathbf{p} - \mathbf{q})$ or $2(\mathbf{q} - 2\mathbf{p})$
	(iii) $-5\mathbf{p}$	2	**M1 (ii)** $-(\mathbf{p} + 2\mathbf{q})$ or $BC - AC = BA$ or **(ii)** $-\mathbf{p} - 2\mathbf{q}$
	(b) 10	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** $\frac{(140+180)\times 21}{2}$ May be done by triangles and rectangles
	(c) 18.7	1ft	**(b)** / 180 evaluated correctly
19	**(a)** 37.1	3	**M1** $50/360 \times \pi \times 10^2$ or $30/360 \times \pi \times 5^2$ **M1** $50/360 \times \pi \times 10^2 - 30/360 \times \pi \times 5^2$
	(b) 41.3	3	**M1** $50/360 \times 2 \times \pi \times 10$ or $30/360 \times 2 \times \pi \times 5$ **M1** 10 + 5 + 10 + 5 + 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	