

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

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.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

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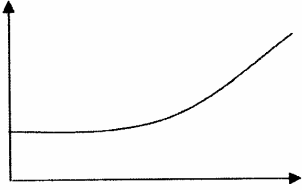
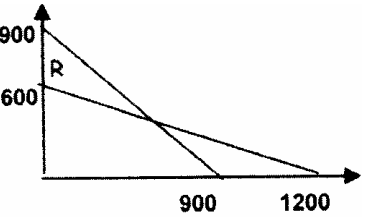
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Abbreviations

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	$a = 3$		W1 one correct
	$b = 4$	2	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		W1 one correct Allow 60.00.. or 120.00..
	120	2	or if W0 , SC1 the angles add up to 180°
7	50.1225 cao	2	M1 6.15 and 8.15 seen
8	$x^2(a+b)$	1	
	$(\pm)\sqrt{(p^2+d^2)(a+b)}$	2	M1 2 moves completed correctly
9	(a) $y = 2x - 4$	2	W1 $2x + c$ <u>or</u> W1 $mx - 4$
	(b) (2, 0)	1ft	For $y = 2x + k$ only, allow $(-k/2, 0)$
10	$x = 8$ $y = 5$	3	M1 $\times 2$ and add or $\times 3$ and subtract A1
11	$\frac{-18}{(2x+3)(x-3)}$ oe	3	W1 denominator correct in answer space (including any brackets) M1 $4(x-3) - 2(2x+3)$ A1 -18
	$x > -0.16$ 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	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 $\frac{(a)}{2\pi} = (r)$

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15	(a) 0.5 or $\frac{1}{2}$	1	
	(b) -1 or -1.(00) cao www	2	M1 cos180
	(c) $\frac{\cos x - 4}{2}$ oe	2	M1 subtracting 4 and then dividing by 2 seen e.g. $\frac{x-4}{2}$ or $\frac{y-4}{2}$ or $\frac{f(x)-4}{2}$
16	(a) 1000 1400 1960 2744 3842 (2740) (3840)	2	W1 three correct 3 sf answers or better
	(b) 	2	P1ft 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) $-3p - 2q$	1	allow $-(3p + 2q)$
	(ii) $-3p + 4q$	1	allow $-(3p - 4q)$
	(iii) $-4p$	2	M1 (ii) $-(p + 4q)$ or $BC - AC = BA$ or (ii) $-p - 4q$
	(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 $\frac{(140 + 180) \times 21}{2}$ 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	