UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2007 question paper

0580 and 0581 MATHEMATICS

0580/03 and 0581/03 Paper 3 (Core), maximum raw mark 104

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.

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UNIVERSITY of CAMBRIDGE
International Examinations

1	**(a)**	**(i)** 35	B1	cao	
		(ii) 7	B1	cao	
		(iii) 8	B1	cao	
		(iv) 7.71 **art**	**B3 ft**	M1 for 1x5 + 5x6 + 10x7 + 9x8 + 7x9 + 3x10 **attempted** M1 for ÷ 35 (ft from **(a)(i)** but not for 6) **SC2 for 7.7**	
	(b)	**(i)** 72	2	M1 for 7/35 x 360 (ft but not for 6) oe	
		(ii) line drawn	B1	final line (ft) drawn accurately, 1° accuracy	[9]
2				all within 1 mm	
	(a)	translation drawn	B2	(–5,4), (–3,4), (–4,5) SC1 for any other translation not parallel to a axis	
	(b)	reflection drawn	B2	(1,–3), (3,–3), (2,–4) SC1 for reflection in x=–1 or any y=k	
	(c)	rotation drawn	B2	(–1,–1), (–3,–1), (–2,–2) SC1 for any 180 rotation or +90, –90 about (0,0)	
	(d)	enlargement drawn	B2	(2,2), (6,2), (4,4) SC1 for any other enlargement sf=2 or centre (0,0)	
	(e)	enlargement (sf=) 1/2 (centre) (0,0)	B1 B1 B1	 **accept O**	[11]

3	**(a)**	–6, –12, –36, 36, 12, 6	B3	B1 for ± 36, B1 for ± 12, B1 for ± 6 SC1 for any 3 correct	
	(b)	12 points plotted	P3	correct points ft within 1 mm P2 for 10 or 11, P1 for 8 or 9, P1 for 1 correct branch	
		2 curves drawn	C1	must be smooth branches of rectangular hyperbola	
	(c)	1.6 to 1.8	B1	ft	
	(d)	36, 9, 0, 9, 36	B2	B1 for 4 correct	
	(e)	13 points plotted	P3	correct points ft within 1 mm P2 for 11 or 12 P1 for 9 or 10	
		curve drawn	C1	must be smooth parabola	
	(f)	3.3, 10.9	B1ft	x from 3.2 to 3.4, y from 10.0 to 12.0	[15]
4	**(a)**	70.7 art	B2	M1 for $5 \times \pi \times 3^2 / 2$ **or better**	
	(b)	5.05 art	B3	M1 for $200 = 5 \times \pi \times r^2 / 2$ oe M1 for $(r^2 =) 400 / 5\pi$ oe	
	(c)	$(r =) \sqrt{2A/5\pi}$	B3	M1 for any correct x or ÷ of 1 term $2A = 5\pi r^2$ MA1 for $r^2 = 2A / 5\pi$ M1 for square root at end	[8]
5	**(a)**	**(i)** –16	B1	cao	
		(ii) 7 or 144 or both	B1		
		(iii) 144	B1	cao	
		(iv) $\sqrt{7}$	B1	cao	
	(b)	2 x 2 x 2 x 5	B2	B1 for 8x5, 2x20, 4x10, 2x4x5, or list 2, 2, 2, 5	
	(c)	11, 29	B1	cao	
		17, 23	B1	cao	[8]

6	**(a)**	**(i)**	78	B1	cao	
		(ii)	5p + 4e	B1	cao	
	(b)	**(i)**	2x + 3y = 57	B1		
			5x + y = 58	B1	**SC1 for different variables**	
		(ii)	15x + 3y = 174	M1	oe, for useful mult. or substitution **(2 terms correct)**	
			x = 9	A1	cao	
			18 + 3y = 57	M1	oe, for using first answer correctly and sensibly	
			y = 13	A1	cao **www4** **ft for M marks only for linear equations in 2 variables**	[8]
7	**(a)**	**(i)**	2.60 art **or 2.6**	B2	M1 for $\sqrt{(3^2–1.5^2)}$ or better ($\sqrt{6.75}$) **oe**	
		(ii)	3.90 art **or 3.9**	B2 ft	M1 for 0.5 x 3 x their**(a)(i)**	
		(iii)	31.2 art	B2 ft	M1 for 8 x their **(a)(ii)**	
	(b)	**(i)**	18	**www2**	M1 for 9 triangles **implied**, or 2 x k, or attempted sketch	
		(ii)	reasonable **sketch**	B1	shows 3 rectangles, 2 triangles in reasonable proportion	
		(iii)	area of "rectangle"	M1	for 16 x 9, 144, 3 x 9 x 16, 27 x 16, 432	
			height of triangle	M1	for $\sqrt{(9^2–4.5^2)}$, $\sqrt{60.75}$, 7.79, **7.8, 3 x (a)(i) ft or trig**	
			area of triangle	M1	for 0.5 x height (ft but not 9) x 9, 35.1, 70.2, **70.1** OR M2 for 9 x 3.90, 9 x their **(a)(ii)**, 35.1 , 70.2, **70.1**	
			total area	M1	3 rectangles and 2 triangles, 432 + 70.2 **or 70.1 soi**	
			502 art	A2	**if M<3 then add SC3 for 502 art with no wrong working seen**	
		(iv)	32.4(0)	B2	M1 for 540 x 6 or figs 324	[17]
8	**(a)**	**(i)**	10 / 12.	B1	oe **2 sf for decimals and %'s (with sign) throughout**	
		(ii)	4 / 12.	B1	oe	
		(iii)	12 / 12.	B1	oe	
	(b)		10.5	B2	M1 for (10+13+10+8+) / 12 or 126 / 12	
	(c)	**(i)**	12 points plotted	B3	B2 for 11, B1 for 10	
		(ii)	ruled line	B1	reasonable, at least from 8 to 19	
		(iii)	negative	B1	cao	[10]

9	**(a)**	**(i)**	arc	B1	full arc, centre T, radius 4 cm, must cover whole of town
		(ii)	locus	B2	must be accurate perpendicular bisector of PQ must show 2 pairs of arcs SC1 for accurate without arcs or with 2 arcs just oor
		(iii)	R labelled	B1	ft if possible
		(iv)	640 to 700 m	B2 ft	SC1 for 3.2 to 3.5 cm **(ft)**
	(b)		locus	B2	must be accurate bisector of angle T must show all arcs SC1 for accurate without arcs or with all arcs just oor
	(c)		correct shading	B2	must be a quadrilateral dependent on at least SC1 in **(a)(ii)** and **(b)** [10]
10	**(a)**		42, 56	B1B1	cao
			71, 97	B1B1	cao
	(b)		n (n + 1) **oe**	B2	M1 for attempt at length x width involving n **or n'th (n'th + 1) or k (k + 1) where k is any variable**
	(c)		12	B2	M1 for $2n^2 - 1 = 287$ [8]