

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.

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

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1	(a) (i)	35	B1	cao	
	(ii)	7	B1	cao	
	(iii)	8	B1	cao	
	(iv)	7.71	art	B3 ft	M1 for $1 \times 5 + 5 \times 6 + 10 \times 7 + 9 \times 8 + 7 \times 9 + 3 \times 10$ attempted M1 for $\div 35$ (ft from (a)(i) but not for 6) SC2 for 7.7
(b)	(i)	72	2	M1 for $7/35 \times 360$ (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]

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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 2 curves drawn	P3 C1	correct points ft within 1 mm P2 for 10 or 11, P1 for 8 or 9, P1 for 1 correct branch 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 curve drawn	P3 C1	correct points ft within 1 mm P2 for 11 or 12 P1 for 9 or 10 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 \div 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) $2 \times 2 \times 2 \times 5$	B2	B1 for 8×5 , 2×20 , 4×10 , $2 \times 4 \times 5$, or list 2, 2, 2, 5	
	(c) 11, 29 17, 23	B1 B1	cao cao	[8]

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6	(a) (i)	78	B1	cao	
	(ii)	$5p + 4e$	B1	cao	
6	(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	
		$18 + 3y = 57$ $y = 13$	M1 A1	oe, for using first answer correctly and sensibly cao	[8]
www4 ft for M marks only for linear equations in 2 variables					
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 $0.5 \times 3 \times$ their(a)(i)	
	(iii)	31.2 art	B2 ft	M1 for $8 \times$ their (a)(ii)	
7	(b) (i)	18	www2	M1 for 9 triangles implied , or $2 \times k$, or attempted sketch	
		reasonable sketch	B1	shows 3 rectangles, 2 triangles in reasonable proportion	
	(ii)	area of "rectangle"	M1	for 16×9 , 144, $3 \times 9 \times 16$, 27×16 , 432	
		height of triangle	M1	for $\sqrt{(9^2-4.5^2)}$, $\sqrt{60.75}$, 7.79, 7.8 , $3 \times$ (a)(i) ft or trig	
		area of triangle	M1	for $0.5 \times$ height (ft but not 9) $\times 9$, 35.1, 70.2, 70.1 OR M2 for 9×3.90 , $9 \times$ 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 540×6 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]

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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 71, 97	B1B1 B1B1	cao 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]