

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.

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 P3 correct points ft within 1 mm
2 curves drawn C1 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 P3 correct points ft within 1 mm
curve drawn C1 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 $8 \times 5, 2 \times 20, 4 \times 10, 2 \times 4 \times 5$, or list 2, 2, 2, 5
- (c) 11, 29 B1 cao
17, 23 B1 cao [8]

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

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- 9 (a) (i) arc B1 full arc, centre T, radius 4 cm, must cover whole of the circle
- (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 over
- (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 over
- (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]