

CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the November 2004 question paper

0580/0581 MATHEMATICS

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

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

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 discussion or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the November 2004 question papers for most IGCSE and GCE Advanced Level syllabuses.



Grade thresholds taken for Syllabus 0580/0581 (Mathematics) in the November 2004 examination.

	maximum	mir	nimum mark re	equired for gra	de:
	mark available	A	С	E	F
Component 3	104	N/A	78	55	45

The threshold (minimum mark) for B is set halfway between those for Grades A and C. The threshold (minimum mark) for D is set halfway between those for Grades C and E. The threshold (minimum mark) for G is set as many marks below the F threshold as the E threshold is above it.

Grade A* does not exist at the level of an individual component.



TYPES OF MARK

Most of the marks (those without prefixes, and 'B' marks) are given for accurate results, drawings or statements.

- **M** marks are given for a correct method. •
- B marks are given for a correct statement or step.
- A marks are given for an accurate answer following a correct method.

ABBREVIATIONS

- a.r.t. Anything rounding to
- Benefit of the doubt has been given to the candidate b.o.d.
- c.a.o. Correct answer only (i.e. no 'follow through')
- e.e.o. Each error or omission
- Follow through f.t.
- Or equivalent o.e.
- SC Special case
- Seen or implied s.o.i.
- ww Without working
- Without wrong working www
 - Work followed through after an error: no further error made



November 2004

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 104

SYLLABUS/COMPONENT: 0580/03, 0581/03

MATHEMATICS

Paper 3



Page 1	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – NOVEMBER 2004	0580/0581	3

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Question number	Mark Scheme	Part Marks	Notes	Question Total
1 a) i)	10	1		
ii)	straight line from (11,10) to (11 30,10)	1		
iii)	straight line from (11 30,10) to (12 45,16)	1√	allow +2 mm in length by eye but must go through the correct points. f.t. from <i>their</i> (1130,10)	
iv)a)	15	1	allow ¼ <u>hour</u>	
b)	Hatab	1		
V)	32	1		
b) i)	450	1		
ii)	straight line ruled from (1,45) to (10,450)	2	SC1 for freehand or broken line or any straight line through the origin ± ½ small square at both points	
iii)a)	$306~\pm~4$	1		
b)	10 60 to 10.80	1	allow 10.6 etc.	11
2 a)	translation	1	must be single transformation	
	$\begin{pmatrix} -6 \\ -7 \end{pmatrix}$	1 1	SC1 for correct vector inverted, or $\begin{pmatrix} -12 \\ -14 \end{pmatrix}$, or for correct row	
			vector, or co-ordinates. Condone missing brackets	
b)	rotation	M1	must be single transformation	
	-90 or 90 clockwise o.e.	A1		
	about (0, 0) o.e.	A1		

Page 2	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – NOVEMBER 2004	0580/0581	3

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c)	(0, 0)	1		
	1.5 o.e.	1	not 3:2 etc.	
d) i)	correct triangle drawn	2	SC1 for reflection of A in any vertical line or in y = -1	
ii)	correct triangle drawn	2	SC1 for 180° rotation about any point or SC1 for rotation $\pm 90^{\circ}$ about (-4,-3)	12
3			In this question alternative methods must be complete	
a)	8	1		
b)	6	2	M1 for $\sqrt{100 - 64}$ o.e. must show square root	
C)	art 53.1	2	M1 for sin and 8/10 seen o.e.	
d)	art 7.15	3	M1 for tan 40 and 6 seen +M1 for 6/tan 40 o.e.	
e)	13.15 or 13.2	1√	f.t. for <i>their b)</i> + <i>d</i>) to 3 s.f. or better	9
4 a) i)	triangle drawn with three sides the correct length ± 0.1 cm	3	 2 for two sides correct, with arcs 1 for two sides correct without arcs 	
ii)	56 ± 2 c.a.o.	1		
b)			in this part of the question deduct 1 once for broken lines	
i)	complete locus drawn	3	 for a line correct distance from PQ for a semicircle 	

Page 3	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – NOVEMBER 2004	0580/0581	3

ii)correct line drawn ± 1 mm, ± 1° correct arcs, radius > 4 cmB1iii)correct arcs shaded2SC1 for shading on left hand side of their 'mediator' or inside lines drawn for their b) i)115 a) i)kite1Allow broken line, one line only11ii)correct line BD drawn1Allow broken line, one line only11iii)correct line BD drawn1Allow broken line, one line only11iii)702M1 for $\frac{360-140-80}{2}$ o.e.b)(p =) 9011(q =) 501M1 for $\frac{360-140-80}{2}$ o.e.(r =) 501M1 for $\frac{360}{2}$ or $\frac{5 \times 180}{7}$ o.e. (may be implied by art 129)116 a)3 0 01,1,1b)7 correct points plottedP3√P2√ for 5 or 6 points ± ½ sm. sq.b)7 correct points plottedP3√P1√ for 4 points. not strict f.t.c)-0.8 to -0.7 c.a.o.1ignore any y values		a sume of the subsection	D4		
iii)correct area shaded2SC1 for shading on left hand side of their 'mediator' or inside lines drawn for their b) i)115 a) i)kite11ii)correct line BD drawn1Allow broken line, one line only1iii)702M1 for $\frac{360-140-80}{2}$ o.e.o.e.b)(p =) 9011(q =) 5011(r =) 5011(r =) 5011128.6 c.a.o.4M2 for 180 - $\frac{360}{7}$ or $\frac{5 \times 180}{7}$ o.e. (may be implied by art 129) +A1 for 128.57116 a)3 0 01,1,1b)7 correct points plottedP3√P2√ for 5 or 6 points ± ½ sm. sq.smooth curve through all correct pointsC1incorrectly plotted points should be ignored for C1. Minimum curved, not pointed	11)	\pm 1 mm, \pm 1°			
hand side of their 'mediator' or inside lines drawn for their b) i)115 a) i)kite1ii)correct line BD drawn1iii)702b) $(p =) 90$ 1 $(q =) 50$ 1 $(r =) 50$ 1 $(r =) 50$ $1\sqrt{140 - 80}{2}$ o.e.c)128.6 c.a.o. $1\sqrt{140 - 180 - 380}{7}$ or $\frac{5 \times 180}{7}$ o.e. (may be implied by art 129) +A1 for 128.57116 a)3 0 01,1,1b)7 correct points plotted $P3\sqrt{140 + 300}{7}$ for 5 or 6 points $\pm \frac{1}{2}$ smooth curve through all correct pointsc1incorrectly plotted points should be ignored for C1. Minimum curved, not pointed		correct arcs, radius > 4 cm	B1		
ii)correct line BD drawn1Allow broken line, one line onlyiii)702M1 for $\frac{360 - 140 - 80}{2}$ o.e.b)(p =) 901(q =) 501(r =) 501 $$ f.t. from their q, not strict f.t.c)128.6 c.a.o.4 $\frac{5 \times 180}{7}$ o.e. (may be implied by art 129) +A1 for 128.576 a)3 0 01,1,1b)7 correct points plottedP3 $$ P2 $$ for 5 or 6 points $\pm \frac{1}{2}$ sm. sq.P1 $$ for 4 points. not strict f.t.C1incorrectly plotted points should be ignored for C1. Minimum curved, not pointed	iii)	correct area shaded	2	hand side of <i>their</i> 'mediator' <u>or</u> inside lines	11
iii) 70 2 only b) $(p =) 90$ 1 $(q =) 50$ 1 c) 128.6 c.a.o. $1\sqrt{4}$ f.t. from their q, not strict f.t. M2 for 180 - $\frac{360}{7}$ or 5×180 $-\frac{360}{7}$ or 5×180 $-\frac{360}{7}$ or 4 $\frac{5 \times 180}{7}$ o.e. (may be implied by art 129) $+A1$ for 128.57 b) 7 correct points plotted P3 $\sqrt{7}$ P2 $\sqrt{7}$ for 5 or 6 points $\pm \frac{1}{2}$ sm. sq. P1 $\sqrt{7}$ for 4 points. all correct points C1 incorrectly plotted points should be ignored for C1. Minimum curved, not pointed	5 a) i)	kite	1		
b) $(p =) 90$ 1 (q =) 50 1 (r =) 50 1 1 f.t. from their q, not strict f.t. M2 for $180 - \frac{360}{7}$ or $\frac{5 \times 180}{7}$ o.e. (may be implied by art 129) +A1 for 128.57 11 6 a) 3 0 0 1,1,1 b) 7 correct points plotted $P3$ $P2$ for 5 or 6 points $\pm \frac{1}{2}$ sm. sq. P1 for 4 points. not strict f.t. incorrectly plotted points should be ignored for C1. Minimum curved, not pointed	ii)	correct line BD drawn	1		
(q =) 501(r =) 50 1 128.6 c.a.o. 1 4 1 6 a) $3 \ 0 \ 0$ 5 $$ correct points plottedb)7 correct points plotted 7 correct points 7 correct	iii)	70	2	M1 for $\frac{360 - 140 - 80}{2}$ o.e.	
c) $(r =) 50$ 128.6 c.a.o. 1 f.t. from their q, not strict f.t. M2 for $180 - \frac{360}{7}$ or $\frac{5 \times 180}{7}$ o.e. (may be implied by art 129) +A1 for 128.57116 a)3 0 01,1,1b)7 correct points plotted $P3$ $P2$ for 5 or 6 points $\pm \frac{1}{2}$ sm. sq.smooth curve through all correct pointsC1incorrectly plotted points should be ignored for C1. Minimum curved, not pointed	b)	(p =) 90	1		
c)128.6 c.a.o.4f.t. M2 for 180 - $\frac{360}{7}$ or $\frac{5 \times 180}{7}$ o.e. (may be implied by art 129) +A1 for 128.57116 a)3 0 01,1,1P2 $\sqrt{$ for 5 or 6 points $\pm \frac{1}{2}$ sm. sq.P1 $\sqrt{$ for 4 points. not strict f.t.b)7 correct points plottedP3 $\sqrt{$ P2 $\sqrt{$ for 5 or 6 points $\pm \frac{1}{2}$ sm. sq.P1 $\sqrt{$ for 4 points. not strict f.t.b)6 a)100100100b)7 correct points plottedP3 $\sqrt{$ P2 $\sqrt{$ for 5 or 6 points $\pm \frac{1}{2}$ sm. sq.b)7 correct pointsP1 $$ for 4 points. not strict f.t.100c)100P1 $\sqrt{$ for 4 points. should be ignored for C1. 		(q =) 50	1		
c)128.6 c.a.o.4M2 for $180 - \frac{360}{7}$ or $\frac{5 \times 180}{7}$ o.e. (may be implied by art 129) +A1 for 128.57116 a)3 0 01,1,1b)7 correct points plotted $P3$ $P2$ for 5 or 6 points $\pm \frac{1}{2}$ sm. sq. $P1$ for 4 points. not strict f.t. $P1$ for 4 points. not strict f.t. $P1$ for C1. Minimum curved, not pointed		(r =) 50	1√		
$\frac{5 \times 180}{7}$ o.e. (may be implied by art 129) +A1 for 128.57116 a)3 0 01,1,1b)7 correct points plotted $P3$ $P2$ for 5 or 6 points $\pm \frac{1}{2}$ sm. sq. $P1$ for 4 points. not strict f.t.all correct pointsC1incorrectly plotted points should be ignored for C1. Minimum curved, not pointed	c)	128.6 c.a.o.	4		
(may be implied by art 129)(may be implied by art 129)6 a)3 0 01,1,1b)7 correct points plotted $P3$ $P2$ for 5 or 6 points $\pm \frac{1}{2}$ sm. sq.b)7 correct points plotted $P3$ $P2$ for 5 or 6 points $\pm \frac{1}{2}$ sm. sq.b)7 correct points plotted $P3$ $P2$ for 4 points. not strict f.t.b)7 correct points $C1$ incorrectly plotted points should be ignored for C1. Minimum curved, not pointed				,	
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b)7 correct points plotted $P3$ $P2$ for 5 or 6 points $\pm \frac{1}{2}$ sm. sq.smooth curve through all correct pointsP1 $$ for 4 points. not strict f.t.P1 $$ for 4 points. not strict f.t.C1incorrectly plotted points should be ignored for C1. Minimum curved, not pointed				+A1 for 128.57	11
smooth curve through all correct points sm. sq. C1 smooth curve through points c1 incorrectly plotted points should be ignored for C1. Minimum curved, not pointed	6 a)	300	1,1,1		
smooth curve through all correct points c1 not strict f.t. incorrectly plotted points should be ignored for C1. Minimum curved, not pointed	b)	7 correct points plotted	Р3√		
all <i>correct</i> points C1 incorrectly plotted points should be ignored for C1. Minimum curved, not pointed		amaath aurua thraugh			
c) -0.8 to -0.7 c.a.o. 1 ignore any y values			C1	should be ignored for C1. Minimum curved, not	
	c)	-0.8 to -0.7 c.a.o.	1	ignore any y values	
2.7 to 2.8 c.a.o. 1		2.7 to 2.8 c.a.o.	1		

Page 4	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – NOVEMBER 2004	0580/0581	3

d)	4 0	1,1		
e)	correct line drawn through (-4,8) and (4,0)	1	complete line	
f)	-1.7 to -1.4 c.a.o.	1	ignore any y values	
	2.4 to 2.7 c.a.o.	1		14
7 a) i)	16	1		
ii)	3x + 8 o.e.	2	M1 for 3x. allow n instead of x. deduct 1 for '= x' or '= 0' or = any number, but allow a different letter	
b)	-9a	1		
	+5b	1		
c)	3a(2 – 3a)	2	M1 for any correct partial factorisation	
d)	$\frac{v-u}{a}$ o.e.	2	M1 for v – u seen	
e)	(x=) 2.5	2	M1 for correct multiplication of LHS of one or both equations to equalise coefficients or for a recognisable attempt to eliminate one variable	
	(y=) -3.5	2	M1 for correct substitution of their other value or M2 correct matrix method	13
8 a) i)	22	1		
ii)	77 or $\frac{67+87}{2}$	2	M1 for evidence of ranking seen anywhere. e.g. 67,87	
iii)	89	2	M1 for their $\frac{\sum x}{12}$	

Page 5	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – NOVEMBER 2004	0580/0581	3

b) i)	72±1	1		
	80±1	1		
	94 ± 1	1		
ii)	1080 ± 5	1√	strict f.t.s for <i>their</i> angle x 15 ± 5	
	1200 ± 5	1√		
	1410 ± 5	1√		
iii)	appropriate observation	1		12
9 a) i)	27 to 36 entered correctly	1		
ii) a)	square	1		
b)	100	1		
c)	n ² c.a.o.	1	allow n x n	
iii)a)	43 c.a.o.	1		
b)	871	2	M1 for 900 – 30 + 1 o.e.	
b) i)	100	1		
ii)	10n c.a.o.	1	allow 10 x n	
iii)	91	1		
vi)	10n – 9 o.e.	1		11
				Total 104