**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.

UNIVERSITY of CAMBRIDGE
International Examinations

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

| | maximum mark available | minimum mark required for grade: | | | |
|---|---|---|---|---|---|
| | | A | C | 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 |
| b.o.d. | Benefit of the doubt has been given to the candidate |
| c.a.o. | Correct answer **only** (i.e. no 'follow through') |
| e.e.o. | Each error or omission |
| f.t. | Follow through |
| o.e. | Or equivalent |
| SC | Special case |
| s.o.i. | Seen or implied |
| ww | Without working |
| www | Without wrong working |
| | 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**

UNIVERSITY *of* CAMBRIDGE
International Examinations

| 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 *their* (1130,10) | |
| **iv)a)** | 15 | **1** | allow ¼ hour | |
| **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 ± 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**<br>**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** | | |

| | | | | |
|---|---|---|---|---|
| **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 $\pm 90^{o}$ 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 *their b) + d)* 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<br>**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** | **1** for a line correct distance from PQ<br>**1** for a semicircle | |

| | | | | |
|---|---|---|---|---|
| **ii)** | correct line drawn<br>± 1 mm, ± 1°<br>correct arcs, radius > 4 cm | **B1**<br><br>**B1** | | |
| **iii)** | correct area shaded | **2** | SC1 for shading on left hand side of *their* 'mediator' or inside lines drawn for *their* **b) i)** | **11** |
| **5 a) i)** | kite | **1** | | |
| **ii)** | correct line BD drawn | **1** | Allow broken line, one line only | |
| **iii)** | 70 | **2** | M1 for $\frac{360-140-80}{2}$ o.e. | |
| **b)** | (p =) 90 | **1** | | |
| | (q =) 50 | **1** | | |
| | (r =) 50 | **1**√ | f.t. from *their* q, not strict f.t. | |
| **c)** | 128.6 c.a.o. | **4** | M2 for 180 - $\frac{360}{7}$ or $\frac{5\times180}{7}$ o.e.<br>(may be implied by art 129)<br><br>+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 ± ½ sm. sq.<br><br>P1√ for 4 points.<br>not strict f.t. | |
| | smooth curve through all *correct* points | **C1** | incorrectly plotted points should be ignored for C1.<br>Minimum curved, not pointed | |
| **c)** | -0.8 to -0.7 c.a.o. | **1** | ignore any y values | |
| | 2.7 to 2.8 c.a.o. | **1** | | |

| | | | | |
|---|---|---|---|---|
| **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 $\frac{\sum x}{12}$ | |

| | | | | |
|---|---|---|---|---|
| **b) i)** | $72 \pm 1$ | **1** | | |
| | $80 \pm 1$ | **1** | | |
| | $94 \pm 1$ | **1** | | |
| **ii)** | $1080 \pm 5$ | **1**√ | strict f.t.s for *their* angle x 15 ± 5 | |
| | $1200 \pm 5$ | **1**√ | | |
| | $1410 \pm 5$ | **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** |