**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**

International General Certificate of Secondary Education

# MARK SCHEME for the October/November 2006 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 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.

The grade thresholds for various grades are published in the report on the examination for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses.

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| Qu. | | | Answer | Marks | Comments | Total |
|-----|--|--|--------|-------|----------|-------|
| 1 | (a) | (i) | $\sqrt{35}$ | 1 | | |
| | | (ii) | 3 | 1 | | |
| | | (iii) | 45 | 1 | | |
| | | (iv) | 2 or 3 or 37 | 1 | accept any combination | |
| | | (v) | 2 | 1 | | |
| | | (vi) | 24 | 1 | | |
| | (b) | (i) | Correct arrangement of triangles drawn. | 1 | accept if only 1 internal line missing | |
| | | (ii) | 16   25   36 | 2 | 1 mark for 2 correct | |
| | | (iii) | 10000 or 1 x $10^4$ | 1 | Not $100^2$ | |
| | | (iv) | $n^2$ or $n \times n$ | 1 | accept t = $n^2$ etc. do not accept $x^2$ | |
| | | (v) | Square (numbers) | 1 | accept squares, squared | |
| | | | | | | 12 |
| 2 | (a) | | –4   –4   –10 | 3 | 1 for each correct entry | |
| | (b) | | 8 correctly plotted points, within $\frac{1}{2}$ square.  Smooth curve through 8 points | P3ft  C1 | P2 for 6 or 7 correct. ft  P1 for 4 or 5 correct. ft  Allow small errors in the points provided shape is maintained. | |
| | (c) | | x = 0.5 drawn. | 1 | must be from (0.5, –9) to curve at least | |
| | (d) | | 2.2 to 2.4 | 1ft | | |
| | (e) | | y = 1 drawn. | 1 | must touch curve as min. length | |
| | (f) | | (x =) –0.7 to –0.5  (x =) 1.5 to 1.7 | 1  1 | | |
| | | | | | | 12 |
| 3 | (a) | (i) | 128.571…… or 128° 34′ (….) | 2 | M1 for 180 – 360/7 oe | |
| | | (ii) | 128.6 | 1 ft | Follow through their (a)(i). | |
| | (b) | (i) | x + 3y + 80 + 95 = 360 (or better) | 1 | | |
| | | (ii) | x + 3y = 185 oe | 1 | Both marks may be gained in (b)(i) | |
| | | (iii) | 40 | 2 ft | M1 for x correctly substituted into the linear equation.  Follow through their (b)(ii) provided linear in x and y. | |
| | (c) | (i) | 180° or angle sum of triangle mentioned | 1 | | |
| | | (ii) | Angle in a semi-circle mentioned. | 1 | | |
| | | (iii) | (a =) 70  (b =) 20 | 1  1 | SC1 for a = 20    b = 70 | |
| | | (iv) | 40 | 1ft | 2 × their value for b provided 0 < b < 55. | |
| | | | | | | 12 |
| 4 | (a) | (i) | Enlargement  (Scale Factor) 3  (Centre) (2, 4) | B1  B1  B1 | . | |
| | | (ii) | Reflection  (in the line) x = 4 | B1  B1 | | |
| | (b) | (i) | Correct translation drawn | 2 | SC1 for translation by the vector. $\begin{pmatrix} -3 \\ 2 \end{pmatrix} \begin{pmatrix} 1 \\ -1.5 \end{pmatrix} \begin{pmatrix} 2 \\ k \end{pmatrix} \begin{pmatrix} k \\ -3 \end{pmatrix}$ | |
| | | (ii) | Correct rotation drawn | 2 | SC1 for any 180° rotation.  SC1 for 90° or 270° rotation about (–1, –2) | |
| | | | | | | 9 |

| | | | | | |
|---|---|---|---|---|---|
| **5 (a)** | 90 | 2 | M1 for $0.5 \times 18 \times 10$ | |
| **(b)** | 14.3  art | 2 | M1 for $10 \times \tan 55$oe | |
| **(c)** | 18.5 to 18.6 | 3 | M1 for $0.5 \times 10 \times$ their **(b)** or M1 $18$ – their **(b)** <br><br> M1 $\frac{1}{2}$ x 10 x their BX <br> M1 for <br> Their **(a)** – $(0.5 \times 10 \times$ their **(b)**$)$ | |
| **(d)** | 20.6  art | 2 | M1 for $\sqrt{(18^2 + 10^2)}$ oe | |
| | | | | 9 |
| **6 (a)** | 750cao | 3 | M1 Figs $10 \div$ figs 20 and figs $15 \div$ figs 10.  OR M1 Figs 10 x Figs 15 and Figs 20 x Figs 10 <br> M1 dep bricks in length $\times$ bricks in height. <br> M1 dep. area of wall $\div$ area of brick. <br> If M0 then SC1 for Figs 75 | |
| **(b) (i)** | 756 | 2 | M1 for $720 \times 1.05$ oe | |
| **(ii)** | 8 | 1ft | Their **(b)(i)** rounded up to the number of hundreds | |
| **(c) (i)** | 10 <br> 4 | 1 <br> 1 | | |
| **(ii)** | 2 | 1ft | Their cement buckets $\div$ 3.5 and rounded up to next whole number | |
| | | | | 9 |
| **7 (a)** | –1 | 2 | SC1 for 1   SC1 for $-\dfrac{k}{K}$ | |
| **(b)** | $(m =)$ 2 <br> $(c =)$ 3 | 1 <br> 1 | | |
| **(c) (i)** | Correct line drawn. | 1 | must cross both axes and line A | |
| **(ii)** | $y = 2x - 3$ oe | 2ft | SC1 for $m = 2$ or $c = -3$. Follow through their line for 2 and SC1. | |
| | | | | 7 |
| **8 (a) (i)** | 3  6  8  7  6  1  1  2 | 3 | 2 for 6 or 7 correct   –1 if tally marks <br> 1 for 4 or 5 correct | |
| **(ii)** | 5.71  art | 3 | M1 for evidence of size x frequency calculated for the sizes. <br> M1dep for sum of at least $5 \div 34$ | |
| **(iii)** | 7  cao | 1 | | |
| **(iv)** | 5  cao | 1 | | |
| **(v)** | 5.5 | 2 | M1 for evidence of finding the middle shoe size. (Not just an answer of 5 or 6) | |
| **(vi)** | 17.6  art | 2ft | M1 for their $6 \div 34 \times 100$  or 17.65 | |
| **(vii)** | 54 or 53 | 2ft | M1 for their $6 \div 34 \times 306$ or '53.8….'. or 53.9 | |
| **(b) (i)** | 12  25  19  2 | 2 | 1 mark for 2 or 3 correct or all correct but not added | |
| **(ii)** | 5 and 6 | 1ft | Their class with the highest frequency. –1 for tally marks | |
| | | | | 17 |

| 9 | (a) | Correct accurate drawing.<br>(lengths ± 0.2 cm, angles ± 1°) | 3 | M1 for angle = 90° = BAC.<br>M1 for AB = 7.5cm and<br>AC = 5.5 cm.<br>A1 for completed triangle.<br>(Dependent on at least one M) | |
|---|---|---|---|---|---|
| | (b)(i) | 233° to 235° | 2ft | From their diagram.<br>M1 for their angle BCA measured<br>correctly (± 1°) | |
| | (ii) | 182 to 190 | 2ft | Their BC × 20.<br>M1 for their BC (correct is 9.1 cm to<br>9.5 cm) | |
| | (iii) | 2 (hours) 42 (mins) | 4 | SC3 for 2.7(0….)<br>M1 for 20 × 1.85<br>M1 for 100 ÷ their 37<br>SC2 for 2 hr 7 mins with no<br>method.<br>B1 for their time correctly changed<br>to hours and minutes. | |
| | (iv) | 24 | 2 | M1 for 18 ÷ 0.75 oe | |
| | (v) | Correct circle drawn | 2 | M1 for partial circle (crossing AB<br>and AC) | |
| | (vi) | 84 to 100 | 2ft | M1 for 4.2 to 5.0<br>Follow through their diagram,<br>dependent on intersections seen on<br>BC | |
| | | | | | 17 |

**Total marks    104**