**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**International General Certificate of Secondary Education**

# MARK SCHEME for the May/June 2013 series

## 0580 MATHEMATICS

**0580/31** 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, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

**Abbreviations**

cao correct answer only
cso correct solution only
dep dependent
ft follow through after error
isw ignore subsequent working
oe or equivalent
SC Special Case
www without wrong working
soi seen or implied

| Qu. | Answers | Mark | Part Answers |
|---|---|---|---|
| **1 (a) (i)** | 750 | 1 | |
| **(ii)** | 11, 11.5 or 12 | 1ft | |
| **(iii)** | 300 | 1 | |
| **(iv)** | 1000 | 1 | |
| **(b) (i)** | 13 02 | 1 | |
| **(ii)** | 10 26 | 1 | |
| **(c) (i)** | 16 24 | 2 | **B1** for 1 (h) 36 or 2 (h) 16 or 3 (h) 49 or 96 or 136 or 229 or 4.24(pm) soi. |
| **(ii)** | 40 cao | 2 | **M1** for 64 ÷ their time (e.g. 1(h) 36(m) ) |
| **(iii)** | 12 32 | 1 | |
| **2 (a)** | 29 | 1 | |
| **(b)** | 42 | 1 | |
| **(c)** | [$r$ =] 66 and [$s$ =] 114 | 1,1ft | Ft is $s = 180 -$ their $r$ |
| **(d)** | 50 | 1 | |
| **(e)** | 56 | 2 | **M1** for either angle at $A$ or $B$ indicated as 90 soi |

| | | | | |
|---|---|---|---|---|
| **3** | **(a) (i)** | one correct line | 1 | |
| | **(ii)** | only two correct lines | 2 | **B1** for either correct line with at most one incorrect |
| | **(b)** | correct square | 1 | |
| | **(c) (i)** | correct reflection | 2 | **B1** for reflection in x = k or $y = 4$ |
| | **(ii)** | correct translation | 2 | **B1** for 5 left or 4 down<br>**SC** for translation of $\begin{pmatrix}-4\\-5\end{pmatrix}$ |
| | **(iii)** | correct rotation | 2 | **B1** for a correct rotation about the wrong centre |
| | **(d) (i)** | rotation<br>centre (0,0)<br>angle 90°<br>[anticlockwise] | 1<br>1<br>1<br>1 | |
| | **(ii)** | translation<br>$\begin{pmatrix}-6\\3\end{pmatrix}$ | 1 | |
| **4** | **(a) (i)** | 140<br>100 | 1<br>1 | if 0 scored **SC1** for their total = 240 |
| | **(ii)** | correct labelled pie chart | 2ft | **B1 ft** for correct sectors drawn<br>**B1** for correct labelling consistent with table |
| | **(b) (i)** | 40 | 1 | |
| | **(ii)** | 29.5 | 2 | **M1** for (attempt to add ) ÷ 12 |
| | **(iii)** | $\frac{7}{12}$ oe | 1 | isw |
| **5** | **(a)** | 4 points plotted correctly | 2 | **B1** for 3 points plotted correctly |
| | **(b)** | negative | 1 | |
| | **(c)** | correct ruled line | 1 | |
| | **(d)** | 22.4 – 22.8 | 1ft | Ft from their (c) if ruled and negative gradient |

| | | | | |
|---|---|---|---|---|
| **6** | **(a) (i)** | 1, 2, 11, 22 | 2 | **B1** for just three of these or 3 correct with 1 extra or all four and up to 2 extras or 1 × 22 and 2 × 11 |
| | **(ii)** | 39 | 1 | |
| | **(b) (i)** | 2,17,19 | 2 | **B1** for just two of these or all three and an extra one |
| | **(ii)** | 1 or 27 | 1 | |
| | **(c) (i)** | $3.5 \times 10^{-3}$ | 1 | |
| | **(ii)** | $4.2 \times 10^{4}$ | 2 | **M1** for 42 000 oe |
| **7** | **(a)** | 86.3 or 86.33075….. | 2 | **M1** for $[BC =]\sqrt{27^2 + 82^2}$ or $\sqrt{729 + 6724}$ or $\sqrt{7453}$ |
| | **(b)** | 090 cao | 1 | |
| | **(c) (i)** | 71.8 or 71.77492….. | 2 | **M1** for tan [$x$=] (82÷27) or better oe |
| | **(ii)** | 108.2 or 108 | 1ft | |
| | **(d) (i)** | 1107 | 2 | **M1** for 27×82÷2 or better, imp by 1110 |
| | **(ii)** | 9 298 800 | 1ft | |
| **8** | **(a)** | 31 200 | 2 | **M1** for (43 680 ÷ 7) × 5 or 6240 × 5 |
| | **(b)** | 16 800 | 3 | **M2** for 15 000 + 15 000 × 0.04 × 3 oe or **M1** for 15 000 × 0.04 × 3 oe, imp by 1800 |
| | **(c)** | 63 | 2 | **M1** for 450 × [0].14 oe |
| | **(d) (i)** | 11 800 | 2 | **M1** for 600 + 0.35 × 32 000 or better |
| | **(ii)** | 12 900 | 2 | **M1** for 100 + 4 × 32 000 ÷ 10 or better |

| | | | | |
|---|---|---|---|---|
| **9** | **(a) (i)** | 2 and 2<br>12 | 1<br>1 | all in the correct places |
| | **(ii)** | 7 points correctly plotted | 3ft | **P2ft** for 5 or 6 points correctly plotted<br>**P1ft** for 3 or 4 points correctly plotted |
| | | correct curve through the 7points | 1 | |
| | **(iii)** | correct line | 1 | Must be ruled and continuous |
| | **(iv)** | 2.6 – 2.8 | 1ft | ft their curve and their line |
| | **(b) (i)** | $\frac{2}{3}$ | 1 | |
| | **(ii)** | $y = \frac{2}{3}x + c$ | 1 | $c$ not –5 |
| | **(c)** | $[y =]\ 2x - 3$ | 3 | **M2** for $y = 2x + p$<br>or **M1** for attempt at gradient i.e. $\frac{rise}{run}$<br>**B1 for** $y = qx - 3 \quad q \neq 0$ |
| **10** | **(a) (i)** | $x + 12$<br>$x - 34 \quad x - 22$ | 1,1,1 | in each part allow correct unsimplified terms |
| | **(ii)** | $x + 12 = 3(x - 22)$ | 1ft | accept $x + 12 = 3x - 66$ or<br>$(x+12) / 3 = x - 22$ |
| | | 39 cao | 3 | **M1** for their $3x - 66$ seen<br>**M1** for correctly collecting terms from $ax + b = cx + d \quad a,b,c,d \neq 0$ |
| | **(e)** | 8<br>– 3 | 3 | **M1** for correct method to eliminate one variable.<br>**A1** for $x$ or $y$ correct. |
| **11** | **(a)** | 113 or 113.09 to 113.112 | 2 | **M1** for $\pi \times 6^2$ or better |
| | **(b)** | 185 or 186 or 185.76<br>or 185.328 to 185.42 | 4 | **M1** for their (a) × 6<br>**M1** for 24 × 36 soi, imp by 864<br>**M1** for their (24 × 36) – their (their (a) × 6) ft their (a) for **M3** |