**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**International General Certificate of Secondary Education**

# MARK SCHEME for the May/June 2012 question paper

# for the guidance of teachers

## 0580 MATHEMATICS

**0580/32** Paper 3 (Core), maximum raw mark 104

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**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 Mark |
|---|---|---|---|
| **1 (a)** | ($) 15 000 | **1** | |
| **(b)** | ($) 500 000 | **2ft** | **M1** for their 15 000 ÷ 3 × 100 |
| **(c)** | 35 | **2** | **M1** for 84 ÷ ( 3 + 5 + 4) or 84 ÷ 12 |
| **(d)** | 40.32 or 40.3 | **2** | **M1** for 4.5 × 3.2 × 2.8 |
| **(e) (i)** | ($) 372 000 | **1** | |
| **(ii)** | ($) 200 000 | **2ft** | **M1** for 992 000 – (their (e)(i) + 420 000) |
| **(iii)** | 42.3 cao | **2** | **M1** for 420 000 ÷ 992 000 × 100 or better |
| **(f)** | ($) 4130 | **3** | **M1** for 3500 × 3 × 6 ÷ 100 oe<br>**A1** for 630 soi<br>After **M1A0** then **SCB1** for their 630 + 3500 |
| **2 (a) (i)** | Reflection<br>$y = -1$ | **1**<br>**1** | |
| **(ii)** | Rotation<br>180 or ½ turn<br>(centre) (0, 0) or O or origin | **1**<br>**1**<br>**1** | |
| **(iii)** | Translation<br>$\begin{pmatrix} 7 \\ -9 \end{pmatrix}$ | **1**<br>**1** | |
| **(b)** | Enlargement scale factor 0.5 drawn at the correct position. | **2** | **B1** for 0.5 enlargement at incorrect position. |
| **3 (a) (i)** | 27 | **1** | |
| **(ii)** | 16 | **1** | |
| **(iii)** | 17 | **1** | |
| **(b) (i)** | 9, 16, 25, 36 | **2** | **B1** for 3 correct or either 3 or 4 correct with other values, or all of $3^2$, $4^2$, $5^2$, $6^2$ |

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| | | | |
|---|---|---|---|
| **(ii)** | 4 from 1, 2, 4, 19, 38, 76 | **2** | **B1** if 3 correct none wrong or 4 correct and 1 wrong or 5 correct and 1 wrong or 6 correct and 1 wrong |
| **(iii)** | 5 or 7 | **1** | |
| **(iv)** | 24 | **2** | **B1** for any other multiple of 24 |
| **(v)** | 14 | **2** | **B1** for answer of 7 or 2 × 7 |
| **4 (a) (i)** | –2, –2.5, –10<br>5, 2.5, 1.25 | **2** | **B1** for 4 or 5 correct |
| **(ii)** | 10 points correctly plotted | **3ft** | **B2**ft for 8 or 9 points correctly plotted.<br>**B1**ft for 6 or 7 points correctly plotted |
| | Smooth curve | **1** | |
| **(b) (i)** | Ruled line through both given points | **2** | **B1** for not ruled but otherwise correct or through just 1 of the points |
| **(ii)** | (–2.5, –4),(2, 5) | **2ft** | **B1** for 1 correct. ft their line and their curve. |
| **(c) (i)** | 2 cao | **2** | **M1** for change in $y$ / change in $x$ for 2 correct points |
| **(ii)** | ($y$ =) $2x + 1$ | **1ft** | Ft ($y$=) their (c)(i) $x$ + intercept of their line in (b)(i) |
| **5 (a)** | 82.5 | **2** | **M1** for $\frac{1}{2}(9.6 + 12.4) \times 7.5$ or better |
| **(b) (i)** | $x^3 - 3xy$ final ans | **2** | **B1** for $x^3$ or $-3xy$ seen |
| **(ii)** | $13w - 22$ final ans | **2** | **B1** for $13w$ or $-22$ or $8w - 12$ or $5w - 10$ seen |
| **(c) (i)** | ($p$ =) $3x + 4y$ final ans | **2** | **B1** for $3x$ or $4y$ seen or $x + 2x + y + 3y$ seen |
| **(ii)** | ($y$ =) $\frac{p-3x}{4}$ oe | **2ft** | **B1**ft for $4y = p - 3x$ or $\frac{p}{4} = \frac{3x}{4} + y$ |
| **(d) (i)** | $2(n + 5) = 3n + 5$ oe | **2** | **B1** for $2(n + 5)$ or $2n + 10$ or $3n + 5$ seen<br>or<br>**B1** for any different letter to $n$ in $2(n + 5) = 3n + 5$ oe |
| **(ii)** | ($n$ =) 5 cao | **3** | **M1** for clearing bracket<br>**M1** for $an = b$ |
| **6 (a) (i)** | 2, 3, 6, 5, 4, 3, 1 | **2** | **B1** for 4 correct or a fully correct tally |
| **(ii)** | 97 | **1ft** | Ft their table |
| **(iii)** | 98 | **2ft** | **M1** for clear recognition of $12^{th}$ / $13^{th}$ value used |

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| | | | |
|---|---|---|---|
| **(iv)** | 104 | **3** | **M1** for clear attempt at finding total hours (implied by 2496)<br>**M1** independent for division by 24<br>but not $\frac{7}{24}$ nor $\frac{835}{24}$ nor $\frac{24}{24}$ |
| **(v)** | Median, extreme value | **1** | Any correct statement referring to the size of the 250 value |
| **(b)** | $\frac{13}{24}$ or 0.5416 to 0.542 isw | **2ft** | **M1** for addition of their frequencies of 98 and above |
| **7 (a)** | 153 to 157 | **1** | |
| **(b)** | Bisector of $AB$ with two sets of arcs | **2** | **B1** for 'correct' line without full sets of arcs |
| **(c) (i)** | Line at 020° | **1** | |
| **(ii)** | 550 to 590 | **2ft** | **B1**ft for 5.5 cm to 5.9 cm seen |
| **(d)** | 447 | **2** | **M1** for 1230 ÷ 2.75 (or 165 or 2.45) |
| **8 (a)** | Isosceles | **1** | |
| **(b) (i)** | Correct triangle with one set of arcs | **2** | **B1** 'correct' triangle without arcs or a triangle with 1 side correct with arcs |
| **(ii)** | 15 cao | **3** | **B1** for their height<br>**M1** for 0.5 × their base × their height |
| **(iii)** | 85 | **2ft** | **M1** for 4 × their (b)(ii) + 5 × 5 |
| **(iv)** | 46 | **2** | **B1** for 26 or 20 or 4 × 6.5 or 4 × 5 seen |
| **(c)** | Correct net | **3** | **B1** for a rectangle or square surrounded by 4 triangles with bases on the sides of the rectangle or square<br>**B1** for accurate square $ABCD$<br>**B1**ft (dep on first 2 marks) for accurate isosceles triangles using their height from (b)(i) |
| **9 (a) (i)** | Diagram 4 drawn | **1** | |
| **(ii)** | 8, 10, 12 | **2** | **B1** for 2 correct or follow through for Diagrams 4 and 5 as 2 more than the previous entry |
| **(b)** | $2n + 2$ oe | **2** | **B1** for $jn + 2$ $(j \neq 0)$ or $2n + k$ |
| **(c)** | 98 | **1ft** | Only follow through a linear expression in (b) |
| **(d)** | 15 | **2** | **B1** for a correct diagram<br>or the sequence 1, 3, 6, ... seen<br>or 5 + 4 + 3 + 2 + 1 seen |

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