

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
International General Certificate of Secondary Education

**MARK SCHEME for the October/November 2009 question paper  
for the guidance of teachers**

**0580 MATHEMATICS**

**0580/03**

Paper 3 (Core), maximum raw mark 104

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| <b>Qn</b> | <b>Answers</b>                                                              | <b>Mark</b> | <b>Notes</b>                                                                                                                     |
|-----------|-----------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b>  | <b>(a) (i)</b> 1/5                                                          | 1           | Accept 0.2 or 20%                                                                                                                |
|           | <b>(ii)</b> 2/5                                                             | 1           | Accept 0.4 or 40%                                                                                                                |
|           | <b>(iii)</b> 0                                                              | 1           | Accept 0/5 or 0%                                                                                                                 |
|           | <b>(b) (i)</b> 6                                                            | 1           | cao                                                                                                                              |
|           | <b>(ii)</b> 1                                                               | 1           | cao                                                                                                                              |
|           | <b>(iii)</b> 2.6 (0) www                                                    | 3           | M1 for $1 \times 8 + 2 \times 4 + 3 \times 5 + 4 \times$ their <b>(b) (i)</b> + $5 \times 2$<br>M1 dep for $\div 25$ or their 25 |
|           | <b>(iv)</b> heights 8, 4, 5, , 2<br>6 or ft height for their <b>(b) (i)</b> | 2<br>1 ft   | SC1 for one error, or small gaps                                                                                                 |
|           |                                                                             |             |                                                                                                                                  |
| <b>2</b>  | <b>(a) (i)</b> 15.7 art                                                     | 2           | M1 for $2 \times \pi \times 2.5$                                                                                                 |
|           | <b>(ii)</b> 19.6 art                                                        | 2           | M1 for $\pi \times 2.5^2$                                                                                                        |
|           | <b>(iii)</b> 14.6 art                                                       | 2           | M1 for $\pi \times (2.5 + 0.8)^2$                                                                                                |
|           | <b>(b)</b> Within range 7840 to 7860                                        | 2 ft        | M1 for their <b>(a) (ii)</b> $\times 0.4 \times 1000$                                                                            |
|           | <b>(c)</b> 31                                                               | 3 ft        | M1 for their <b>(b)</b> $\div 250$ soi<br>A1 ft for 31.4 art<br>W1 for their answer correctly rounded                            |
| <b>3</b>  | <b>(a) (i)</b> 4.5                                                          | 2           | M1 for $15 \times 3 / (7+3)$                                                                                                     |
|           | <b>(ii)</b> 3                                                               | 1 ft        | Their <b>(a) (i)</b> $\div 2$ and rounded up                                                                                     |
|           | <b>(b) (i)</b> 8.14                                                         | 3           | M1 for $100 - 12$ soi<br>M1 for $9.25 \times$ their $88 / 100$                                                                   |
|           | <b>(ii)</b> 32.56                                                           | 1 ft        | $4 \times$ their <b>(b) (i)</b>                                                                                                  |
|           | <b>(iii)</b> 46.25                                                          | 1           | cao                                                                                                                              |
|           | <b>(iv)</b> 8.75(6...) or 8.76                                              | 3           | M1 for (their <b>(ii)</b> + their <b>(iii)</b> ) soi<br>2 <sup>nd</sup> M1 dep for $\div (4 + 5)$ soi                            |
|           |                                                                             |             |                                                                                                                                  |

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|   |         |                                                                                 |            |                                                                                        |
|---|---------|---------------------------------------------------------------------------------|------------|----------------------------------------------------------------------------------------|
| 4 | (a) (i) | Isosceles                                                                       | 1          | Condone spelling                                                                       |
|   | (ii)    | <i>DNC</i>                                                                      | 1          | Condone order of letters                                                               |
|   | (iii)   | $70^\circ$                                                                      | 1          | cao                                                                                    |
|   | (b) (i) | $49.4^\circ$ or $49^\circ 24'$ art                                              | 2          | M1 for inv tan (7/6)                                                                   |
|   | (ii)    | 9.22 art                                                                        | 2          | M1 for $\sqrt{(6^2 + 7^2)}$ soi (e.g. $\sqrt{85}$ )                                    |
|   | (c)     | 12.2 art                                                                        | 3          | M2 for $7/\sin 35$                                                                     |
|   | (d)     | 42.8(4....) or 42.85                                                            | 2 ft       | M1 for $2 \times [\text{their (b) (ii)} + \text{their (c)}]$ oe                        |
| 5 | (a)     | $2 \quad -6 \quad 2$                                                            | 1, 1, 1    |                                                                                        |
|   | (b)     | seven points correctly plotted<br>smooth correct curve through 7 correct points | P3ft<br>C1 | 5 or 6 P2ft, 3 or 4 P1ft                                                               |
|   | (c) (i) | $(-2, -7)$                                                                      | 1          | cao                                                                                    |
|   | (ii)    | $-4.6$ to $-4.75$<br>and $0.6$ to $0.75$                                        | 1<br>1     | cao<br>cao                                                                             |
|   | (d) (i) | correct point marked                                                            | 1          | Condone lack of label                                                                  |
|   | (ii)    | <u>ruled</u> line from their <i>A</i> to their $(0, -3)$                        | 1          | <u>Continuous</u> line of this minimum length                                          |
|   | (iii)   | $-4 / 2$ oe                                                                     | 2          | M1 for attempt at gradient<br>or<br>SC1 for 2 oe or $-1$ oe from correct line          |
|   | (iv)    | $y = -2x - 3$ oe                                                                | 2          | SC1 for $y = kx - 3$ oe or $y = -2x + k$ oe<br>or $y = \text{their (d) (iii)}x + k$ oe |

|               |                                       |                 |              |
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|          |                |                                                                        |                 |                                                                                             |
|----------|----------------|------------------------------------------------------------------------|-----------------|---------------------------------------------------------------------------------------------|
| <b>6</b> | <b>(a)</b>     | $x + 4$                                                                | 1               |                                                                                             |
|          | <b>(b)</b>     | $3x$                                                                   | 1               |                                                                                             |
|          | <b>(c) (i)</b> | $x + x + 4 + 3x$<br>$5x + 4$                                           | M1 ft<br>A1 cao | soi ft is $x + (a) + (b)$<br>$5x + 4$ www scores both marks                                 |
|          | <b>(ii)</b>    | Their <b>c (i)</b> $\div 3 = 28$ or their <b>c (i)</b> $= 28 \times 3$ | 1               |                                                                                             |
|          | <b>(iii)</b>   | $(x = ) 16$                                                            | 2               | M1 for $5x = 84 - 4$ or $5x = 80$ or $x = 80/5$                                             |
|          | <b>(d)</b>     | 48 or $3 \times$ their $x$                                             | 1 ft            | Ft is $3 \times$ <b>(c) (iii)</b>                                                           |
|          | <b>(e)</b>     | 84%                                                                    | 2               | M1 for $63 / 75 \times 100$                                                                 |
| <b>7</b> | <b>(a)</b>     | 4                                                                      | 1               | cao                                                                                         |
|          | <b>(b)</b>     | 4 correct lines drawn, accept reasonable freehand                      | 2               | SC1 for 2 correct lines                                                                     |
|          | <b>(c)</b>     | 2600                                                                   | 3               | M1 for $2800 \times 1.75$ or 4900<br>M1 for their $4900 - 2300$                             |
|          | <b>(d)</b>     | 3100.40                                                                | 2               | M1 for $2300 \times 1.348$                                                                  |
|          | <b>(e)</b>     | 5962.32                                                                | 3               | M2 for $5000 \times (1.092)^2$<br>SC1 for $5000 \times (1.92)^2$ or full equiv.<br>or 18432 |

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|   |         |                                                                                              |            |                                                                                                              |
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| 8 | (a) (i) | Correct X                                                                                    | 2          | SC1 for translation of $\begin{pmatrix} 2 \\ -7 \end{pmatrix}$                                               |
|   | (ii)    | Correct Y                                                                                    | 2          | SC1 for rotation through 90 clockwise<br>Or 90 anticlockwise about any point                                 |
|   | (b) (i) | Correct $Z_1$                                                                                | 2          | SC1 for reflection in $y$ axis<br>Or in any horizontal line                                                  |
|   | (ii)    | Correct $Z_2$                                                                                | 2 ft       | strict ft <b>reflection</b> of their $Z_1$ if possible<br>SC1 for reflection in $y = 4$ or any vertical line |
|   | (iii)   | Translation, $\begin{pmatrix} 8 \\ 4 \end{pmatrix}$<br>OR Rotation, through 180 about (4, 0) | 1, 1       | W1 transformation, W1 full description<br>SC2 for Enlargement sf = -1 coe (4, 0)                             |
| 9 | (a)     | 13 21<br>10 15                                                                               | 1 1<br>1 1 | cao<br>cao                                                                                                   |
|   | (b)     | 43<br>28                                                                                     | 1<br>1     | cao<br>cao                                                                                                   |
|   | (c) (i) | $\frac{1}{2} \times 5 \times 6$<br>= 15 seen                                                 | 1<br>1dep  | accept $\frac{1}{2} \times 5 \times (5 + 1)$                                                                 |
|   | (ii)    | $\frac{1}{2} \times 20 \times 21$<br>= 210                                                   | 1<br>1     | accept $\frac{1}{2} \times 20 \times (20 + 1)$<br>accept 210 www for both marks                              |
|   | (d)     | (k =) -1                                                                                     | 2          | M1 for $7 = 3^2 + k \times 3 + 1$ oe                                                                         |