

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

**MARK SCHEME for the May/June 2009 question paper**  
**for the guidance of teachers**

**0580, 0581 MATHEMATICS**  
0580/03, 0581/03      Paper 3 (Core), maximum raw mark 104

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### Abbreviations

|     |                               |
|-----|-------------------------------|
| cao | correct answer only           |
| ft  | follow through after an error |
| oe  | or equivalent                 |
| SC  | Special Case                  |
| www | without wrong working         |

| Qu       | Answers   | Mark | Part marks   |
|----------|---|------|--|
| <b>1</b> | <b>(a) (i)</b> $6000 \div (7 + 5 + 3)$              | 1    | M1 $6000 \div$ clear attempt at total  |
|          |   | 1    | M1 Dependent on first mark.  |
|          | <b>(ii)</b> (Stephano) 2000 www<br>(Tania) 1200 www | 1    | Must be clearly Stephano.  |
|          |   | 1    | Must be clearly Tania.   |
|          | <b>(b) (i)</b> (\$)47040                            | 2    | M1 $1.40 \times 12 \times 2800$  |
|          |   | 2ft  | M1 $\frac{3}{5} \times '47040'$ or $0.6 \times '47040'$  |
|          | <b>(c)</b> (\$)1200                                 | 2    | M1 $5000 \times 8 \times 3 \div 100$<br>SC1 for final answer 6200  |
|          | <b>(d)</b> (\$) 14292                               | 4    | M2 $12000 \times (1.06)^3$<br>Or M1 $(12000 + 12000 \times 0.06) \times 0.06$<br>M1 dep. Correct method for the next 2 years |
|          |   |      | A1cao (\$)14292(.19(2))<br>W1ft<br>Their answer rounded to the nearest dollar.   |
|          |   |      | If M0 then maximum<br>SC2 for (\$) 2292 or<br>SC1 for (\$) 2292.2 or<br>(\$) 2292.19(2) or (\$) 2300                         |
|          |   |      |  |

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|     |               |   |  |                            |   |
|-----|---------------|---|--|----------------------------|---|
| 2   | (a)           | One-third of 360 oe   | 1  |                            |   |
|     | (b)           | (i)   | 30   | 1                          |   |
|     |               | (ii)  | 90   | 1                          |   |
|     |               | (iii)   | 60   | 1ft                        | 90 – their (b) (i)  |
|     | (c)           | (i)   | 26(.0) or 25.98(.....)   | 2ft                        | M1 30cos (b) (i) or 30sin(90 – (b) (i))<br>or equivalent <b>full</b> method |
|     |               | (ii)  | (c) (i)sin (b) (iii) oe<br>22.5  | 1<br>1                     | M1 for correct full method for AD<br>W1 dependent on M1                     |
| (d) | 48.36 to 48.4 | 2   | M1 $\tan(AED) = \frac{22.5}{20}$<br>or $\cos(AED) = \frac{20}{\sqrt{20^2 + 22.5^2}}$ or<br>$\sin(AED) = \frac{22.5}{\sqrt{20^2 + 22.5^2}}$ |                            |   |
| 3   | (a)           | Horizontal line from (08 30, 30) to (09 30, 30)               | W1   |                            |   |
|     |               | Line from (their 09 30, 30) to (10 15, 380)                   | W1ft   | Only ft from their 09 30   |   |
|     |               | Horizontal line from their (10 15, 380) to (10 50, their 380) | W1ft   | Ft incorrect 10 15 and 380 |   |
|     |               | Line from their (10 50, 380) to (11 30, 420)                  | W1ft   | Ft incorrect 10 50 and 380 |   |
| (b) | (i)           | 0.75 or $\frac{3}{4}$ hour                                    | 1  |                            |   |
|     | (ii)          | 466 to 467  | 2cao   | M1 for 350 ÷ their (b) (i) |   |
| (c) | 35            | 3cao  | W1ft (air) 3 h 30 mins oe 210 min<br>W1(train) 2 h 55 mins oe 175 min  |                            |   |

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|   |         |   |      |  |
|---|---------|---|------|--|
| 4 | (a) (i) | $x - 4$   | 1    |  |
|   | (ii)    | $2x + 5$  | 1    | Allow $x + x + 5$  |
|   | (iii)   | ' $2x + 5$ ' = $3 \times$ ' $(x - 4)$ ' oe  | 1ft  | Only ft linear expressions in $x$ .  |
|   | (iv)    | $(x =)$ 17 www  | 3cao | M1 ' $3x - 12$ '<br><br>M1 indep $px = q$<br>Reducing their equation to a single term in $x$ and a single constant.  |
|   | (b)     | $(x =)$ 2, $(y =)$ 1.5  | 3    | M1 for complete correct method<br>A1 for 1 correct answer<br>ww both correct W3<br>ww one correct W0<br><br>Multiply and add/subtract. 2 terms correct.<br>Eliminate $x$ : subtract + 2 terms right<br>Eliminate $y$ : add + 2 terms right.<br>Substitution<br>M1 for $3(8 - 4y) - 2y = 3$ or<br>$x + 4\left(\frac{3x-3}{2}\right) = 8$ or $3x - 2\left(\frac{8-x}{4}\right) = 3$ or<br>$\left(\frac{3-2y}{3}\right) + 4y = 8$ or $\left(\frac{3+2y}{3}\right) = 8 - 4y$ or<br>$\left(\frac{3x+3}{2}\right) = \left(\frac{8+x}{4}\right)$ or better. |
| 5 | (a)     | Reflection in $y$ axis or $x = 0$<br>Translation $\begin{pmatrix} 8 \\ 0 \end{pmatrix}$ or 8 right (only) | 2    | W1 transformation W1 Line  |
|   |         |   | 2    | W1 transformation<br>W1 vector or description  |
|   | (b)     | Correct reflected pentagon  | 2    | SC1 $A$ reflected in a horizontal line, not the $x$ axis   |
|   | (c)     | Correct rotated pentagon  | 2    | SC1 $B$ rotated anti-clockwise $90^\circ$ about the origin or $90^\circ$ clockwise about any other point.  |
|   | (d)     | Rotation, 180, (About) origin oe  | 3    | W1 rotation, W1 180, W1 origin<br>SC3 Enlargement (SF) $-1$ origin<br>Accept $(0, 0)$ for origin.  |
|   | (e)     | Correct enlarged pentagon   | 2    | W1 for any enlargement of $A$ with a scale factor of $\frac{1}{2}$ .   |

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|     |       |  |   |   |   |
|-----|-------|--|---|---|---|
| 6   | (a)   | Octagon  | 1   |   |   |
|     | (b)   | 135  | 2   | M1 for $180 - (360 \div 8)$ oe  |   |
|     | (c)   | (i)  | Angle $OAB =$ their (b)/2 or angle $AOM = 90 -$ their (b)/2<br>$4 \times \tan '67.5'$ or $4 \div \tan '22.5'$<br>9.656... or 9.66 | W1ft<br>M1<br>A1cao   | 67.5 or 22.5 correct values,<br>Dep on W1 <b>and</b> M1 |
|     |       | (ii)   | 38.6 to 38.64   | 2   | M1 for $0.5 \times 8 \times 9.66$                       |
|     | (iii) | 308.8 to 309.12  | 1ft   | Their (c) (ii) $\times 8$   |   |
|     | (d)   | 3705.6 to 3709.44 or 3710  | 1ft   | Their (c) (iii) $\times 12$   |   |
| (e) | (i)   | 2400   | 2cao  | M1 for $3 \times 2 \times 2 \times 200$   |   |
|     | (ii)  | 35.2(3...) to 35.3(0...)   | 3cao  | M1 for their ((d) – (e) (i)) soi.<br>M1 for $\frac{(d)-(e)(i)}{(d)} \times 100$<br>Or M2 for $\left(1 - \frac{(e)(i)}{(d)}\right) \times 100$<br>SC1 for Answer 64.7 to 64.77 |   |
| 7   | (a)   | x 0 1 2 3 4 5 6 7 8 9<br>y 0 8 14 18 20 20 18 14 8 0   | 3   | W2 for 4 correct<br>W1 for 3 correct  |   |
|     | (b)   | Their 10 points correctly plotted, within half a square.<br>Smooth curve through the 10 correct points | P3ft  | P2ft for 8 or 9 correct<br>P1ft for 6 or 7 correct  |   |
|     |       |  | C1  | Shape must be correct and the curve goes above $y = 20$ .   |   |
|     | (c)   | (x =) 4.4 to 4.6<br>(y =) 20.1 to 20.5   | 1cao<br>1cao  |   |   |
| (d) | (i)   | <b>Ruled</b> line $y = 6$  | 1   |   |   |
|     | (ii)  | 8.1 to 8.5 Must be to 1 decimal place<br>0.5 to 0.9 Must be to 1 decimal place                         | 1cao<br>1cao  | SC1 for both correct but not to 1dp e.g. 8.27 and 0.73  |   |

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|       |                                  |                                      |   |  |
|-------|----------------------------------|--------------------------------------|---|--|
| 8     | (a)                              | 5,<br>126,      90                   | 1<br>1, 1   | SC1 for both angles incorrect but total  |
|       | (b) (i)                          | 3, 5, 6, 4, 2                        | 2   | W1 for 3 or 4 correct or left as tallies and a correct.  |
|       | (ii)                             | Blocks 'correct' heights<br>No gaps. | 2ft   | W1 for only 1 incorrect<br>SC1 All correct but small gaps between or full horizontal lines only                                    |
|       | (c) (i)                          | 10 points plotted correctly          | 3   | W2 for 8 or 9 correct<br>W1 for 6 or 7 correct<br>On vertical age line ( $\pm 1$ mm) and between (or on) correct horizontal lines. |
|       | (ii)                             | Zero oe                              | 1   | (allow weak (slight) negative)   |
| (iii) | $\frac{3}{20}$ oe or 0.15 or 15% | 2ft                                  | Ft numerator only<br>W1 for $\frac{their\ 3}{k} \ k \geq 3$ |  |
| 9     | (a) (i)                          | -8,<br>-13                           | 1cao<br>1ft   | Ft sixth term 5 less than the fifth  |
|       | (ii)                             | Subtract 5 oe                        | 1   |  |
|       | (iii)                            | $-5n + 17$                           | 2   | W1 for $jn + 17$ or $-5n + k$ where $j$ and $k$ are integers, $j \neq 0$   |
|       | (b)                              | $5n - 8$                             | 2   | W1 for $jn - 8$ or $5n - k$ where $j$ and $k$ are integers, $j \neq 0$   |
|       | (c)                              | 9 www                                | 1ft   | Ft two linear expressions only   |