

**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

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 must be read in conjunction with the question papers and the report on the examination.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the May/June 2009 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

**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> $6000 \div (7 + 5 + 3)$<br><br>Multiply by 7 | 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 $1.40 \times 12 \times 2800$                                   |  |
|          | <b>(ii)</b> (\$)28224                                       | 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<br><br>A1cao (\$)14292(.19(2))<br>W1ft<br>Their answer rounded to the nearest dollar.<br><br>If M0 then maximum<br>SC2 for (\$) 2292 or<br>SC1 for (\$) 2292.2 or<br>(\$) 2292.19(2) or (\$) 2300 |

|     |               |  |  |  |
|-----|---------------|--|--|--|
| 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<br>(09 30, 30)<br>Line from (their 09 30, 30) to (10 15, 380)<br>Horizontal line from their (10 15, 380) to<br>(10 50, their 380)<br>Line from their (10 50, 380) to<br>(11 30, 420) | W1<br>W1ft<br>W1ft<br>W1ft   | Only ft from their 09 30<br>Ft incorrect 10 15 and 380<br>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                |

|   |         |   |      |  |
|---|---------|---|------|--|
| 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 $\frac{1}{2}$ .   |

|      |       |  |   |   |   |
|------|-------|--|---|---|---|
| 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<br>C1  | P2ft for 8 or 9 correct<br>P1ft for 6 or 7 correct<br>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  |   |

|       |                                  |                                      |  |  |
|-------|----------------------------------|--------------------------------------|--|--|
| 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 $\frac{\text{their } 3}{k} k \geq 3$ |  |
| 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   |