

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.

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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 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 $64 \div$ 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 |

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

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

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| | | | | |
|----|---------|---|--------------|---|
| 9 | (a) (i) | 2 and 2 12 | 1 1 | all in the correct places |
| | (ii) | 7 points correctly plotted correct curve through the 7points | 3ft 1 | P2ft for 5 or 6 points correctly plotted P1ft for 3 or 4 points correctly plotted |
| | (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 $y = 2x + p$ or M1 for attempt at gradient i.e. $\frac{\text{rise}}{\text{run}}$ B1 for $y = qx - 3 \quad q \neq 0$ |
| 10 | (a) (i) | $x + 12$ $x - 34 \quad x - 22$ | 1,1,1 | in each part allow correct unsimplified terms |
| | (ii) | $x + 12 = 3(x - 22)$ 39 cao | 1ft 3 | accept $x + 12 = 3x - 66$ or $(x + 12) / 3 = x - 22$ M1 for their $3x - 66$ seen M1 for correctly collecting terms from $ax + b = cx + d \quad a, b, c, d \neq 0$ |
| | (e) | 8 -3 | 3 | M1 for correct method to eliminate one variable. 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 or 185.328 to 185.42 | 4 | M1 for their (a) $\times 6$ M1 for 24×36 soi, imp by 864 M1 for their $(24 \times 36) - \text{their (their (a) } \times 6)$ ft their (a) for M3 |