## MARK SCHEME for the October/November 2013 series

## 0580 MATHEMATICS

0580/23
Paper 2 (Extended), maximum raw mark 70

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 |


| Qu. | Answers | Mark | Part Marks |
| :---: | :---: | :---: | :---: |
| 1 | 39 | 2 | M1 for $52 \times 45 \div 60$ oe |
| 2 | Any two of ( 20,8$)(-4,0)(12,24)$ | 2 | B1 for one correct |
| 3 | -8 | 2 | M1 for $2 x=-16$ or $\frac{1}{2}+x=-7.5$ oe or better |
| 4 | $\tan 100, \cos 100,1 / 100,100^{-0.1}$ | 2 | B1 for decimals -0.1 [ [7..], $-5 .[67 .],$. [0.01], 0.6 [3.] or for three in the correct order |
| 5 | (a) 600000 <br> (b) 79.2 | $2$ | M1 for $22 \times 60 \times 60 \div 1000$ oe |
| 6 | 25[.00] | 3 | M2 for $30 \times \frac{100}{120}$ oe or M1 for 30 associated with 120\% e.g. $1.2 x=30$ |
| 7 | 5 | 3 | M2 for $(x-5)(x-1)$ <br> or <br> M1 for evidence of a factorisation which gives the correct coefficient of $x$ or positive prime constant term e.g. $(x-7)(x+1),(x-4)(x-2)$, $(x-3)(x-1)$ |
| 8 | 1.6 oe | 3 | $\begin{aligned} & \text { M1 for } m=k x^{3} \\ & \text { A1 for } k=25 \end{aligned}$ |
| 9 | (a) $a^{2}+2 a b+b^{2}$ <br> (b) 22 | $\begin{aligned} & 2 \\ & 1 \end{aligned}$ | B1 for $a^{2}[+] a b[+] a b[+] b^{2}$ or better seen |
| 10 | 160 | 3 | M1 for $\sin 15=\frac{[]}{628}$ oe or better |


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| 11 | (a) $\left(\begin{array}{cc}3 & -1 \\ 4 & 2\end{array}\right)$ <br> (b) $\frac{1}{10}\left(\begin{array}{cc}2 & 1 \\ -4 & 2\end{array}\right) \mathrm{oe}$ | 2 | B1 for $\frac{1}{10}\left(\begin{array}{ll}a & b \\ c & d\end{array}\right)$ or $\mathbf{B 1}$ for $k\left(\begin{array}{cc}2 & 1 \\ -4 & 3\end{array}\right)$ |
| :---: | :---: | :---: | :---: |
| 12 | (a) $7.5 \times 10^{-2}$ <br> (b) $9.3 \times 10^{7}$ | 2 <br> 2 | M1 for 0.075 or $\frac{3}{40}$ or $\frac{6}{80}$ or $0.75 \times 10^{-1}$ oe <br> M1 for 93000000 or $93 \times 10^{6}$ or $0.93 \times 10^{8}$ oe |
| 13 | (a) 24 <br> (b) 24 | $\begin{aligned} & 2 \\ & 2 \end{aligned}$ | $\begin{aligned} & \text { M1 for } M O C=48 \\ & \text { M1 for } A C M=66 \\ & \text { or } \\ & \text { B1 for } 48-\text { their }(\mathbf{a}) \end{aligned}$ |
| 14 | (a) $8 q^{-1}$ or $\frac{8}{q}$ <br> (b) $1 / 5$ or 0.2 | 2 | B1 for $8 q^{k}$ or $k q^{-1}$ <br> M1 for $5^{-2}, \frac{1}{5^{2}}$ or $[0] .04$ seen oe |
| 15 | (a) Circle, radius 3 cm , centre $A$, not inside the rectangle <br> (b) One line of symmetry with correct arcs. E.g.: | 2 $2$ | M1 for arc or full circle centre A radius 3 cm or for an incorrect size circle at A outside rectangle <br> B1 for correct ruled line (must reach or cross two sides) <br> B1 for 2 pairs of intersecting arcs |
| 16 | (a) 8.61 or 8.609 to 8.6102 <br> (b) 430 or 431 or 430.4 to 430.41 | 4 <br> 1FT | M1 for $\frac{1}{2} \times 3^{2} \times \pi \times \sin 120$ <br> M1 for $\frac{30}{360} \times \pi \times 3^{2}[\times 2]$ <br> M1 for area of triangle +2 sectors <br> FT their (a) $\times 50$ |


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\begin{tabular}{|c|c|c|c|}
\hline 17 \& \begin{tabular}{l}
(a) triangle at \((0,3)(2,3)\) and \((2,4)\) \\
(b) reflection in \(y\) axis
\end{tabular} \& 3
2 \& \begin{tabular}{l}
B1 for each correct vertex If 0 scored then M1 for correct reflection in the \(y\) axis or correct translation of their first stage 3 right 2 up \\
B1 for reflection \\
B1 for \(y\) axis or \(x=0\)
\end{tabular} \\
\hline 18 \& \begin{tabular}{l}
(a) 19-19.1 \\
(b) 3 \\
(c) 4.9 to 5.7 \\
(d) \(\frac{45}{50} \mathrm{oe}\)
\end{tabular} \& 1
2
2
2 \& \begin{tabular}{l}
M1 for 47 seen \\
B1 for [UQ] 21.7 to 22.2 and [LQ] 16.5 to 16.8 \\
B1 for 45 seen or SC1 for \(\frac{5}{50}\) isw
\end{tabular} \\
\hline 19 \& \begin{tabular}{l}
(a) 75 \\
(b) \(3.5-6.5\) \\
(c) \(\frac{x-3}{2}\) oe final answer \\
(d) 5
\end{tabular} \& 2
3

2 \& | B1 for $[\mathrm{g}(6)=] 36$ |
| :--- |
| M1 for $(2 x+3)^{2}=100$ |
| M1 for $2 x+3=[ \pm] 10$ |
| If 0 scored, SC1 for one correct value as answer |
| M1 for $x=2 y+3$ or $y-3=2 x$ or $\frac{y}{2}=x+\frac{3}{2}$ or better | <br>

\hline
\end{tabular}

