## 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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| Page 2 | Mark Scheme                   | Syllabus | Paper |
|--------|-------------------------------|----------|-------|
|        | IGCSE – October/November 2013 | 0580     | 23    |

## Abbreviations

- correct answer only cao
- correct solution only cso
- dep dependent
- follow through after error ft
- ignore subsequent working isw
- or equivalent oe
- Special Case SC

| Qu. | Answers                                      | Mark  | Part Marks  |
|-----|--|---|---|
| 1   | 39   | 2   | <b>M1</b> 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   | <b>M1</b> for $2x = -16$ or $\frac{1}{2} + x = -7.5$ oe or better   |
| 4   | tan 100, cos 100, 1/100, 100 <sup>-0.1</sup> | 2 B1 for decimals -0.1[[7], -5.[67], [0.0<br>0.6[3] or for three in the correct order |   |
| 5   | (a) 600 000                                  | 1   | S   |
|     | <b>(b)</b> 79.2                              | 2   | <b>M1</b> for $22 \times 60 \times 60 \div 1000$ oe   |
| 6   | 25[.00]                                      | 3   | M2 for $30 \times \frac{100}{120}$ oe<br>or M1 for 30 associated with 120%<br>e.g. $1.2x = 30$  |
| 7   | 5  | 3   | M2 for $(x-5)(x-1)$<br>or<br>M1 for evidence of a factorisation which gives<br>the correct coefficient of x or positive prime<br>constant term e.g. $(x-7)(x+1)$ , $(x-4)(x-2)$ ,<br>(x-3)(x-1) |
| 8   | 1.6 oe                                       | 3   | <b>M1</b> for $m = kx^3$<br><b>A1</b> for $k = 25$  |
| 9   | (a) $a^2 + 2ab + b^2$                        | 2   | <b>B1</b> for $a^2$ [+] $ab$ [+] $ab$ [+] $b^2$ or better seen  |
|     | <b>(b)</b> 22                                | 1   |   |
| 10  | 160  | 3   | <b>M1</b> for sin $15 = \frac{[]}{628}$ oe or better  |

|    | Page 3 Mark Sche  |   |     |  | Syllabus  | Paper                 |
|----|---|---|-----|--|---|-----------------------|
|    | IGCSE – October/N   |   |     |  | 0580  | 23                    |
| 11 | (a) $\begin{pmatrix} 3 & - \\ 4 & 2 \end{pmatrix}$              |   | 1   |  |   |                       |
|    | <b>(b)</b> $\frac{1}{10} \begin{pmatrix} 2 \\ -2 \end{pmatrix}$ | $\begin{pmatrix} 1 \\ 4 & 2 \end{pmatrix} oe$ | 2   | <b>B1</b> for $\frac{1}{10} \begin{pmatrix} a \\ c \end{pmatrix}$<br>$k \begin{pmatrix} 2 & 1 \\ -4 & 3 \end{pmatrix}$ | $\begin{pmatrix} b \\ d \end{pmatrix}$ or <b>B1</b> for | 2.                    |
| 12 | (a) 7.5 × 1   | 0 <sup>-2</sup>                               | 2   | <b>M1</b> for 0.075 o  | r $\frac{3}{40}$ or $\frac{6}{80}$ or 0.75              | $\times 10^{-1}$ oe   |
|    | <b>(b)</b> 9.3 × 1  | 07  | 2   | <b>M1</b> for 93 000   | 000 or $93 \times 10^6$ or (                            | $0.93 \times 10^8$ oe |
| 13 | <b>(a)</b> 24   |   | 2   | <b>M1</b> for <i>MOC</i> =   | 48  |                       |
|    | <b>(b)</b> 24   |   | 2   | M1 for <i>ACM</i> =<br>or<br>B1 for 48 – <i>the</i>  |   |                       |
| 14 | (a) $8q^{-1}$ or  | $\frac{8}{q}$                                 | 2   | <b>B1</b> for $8q^k$ or $ka$   | $I^{-1}$  |                       |
|    | <b>(b)</b> 1/5 or (   | 0.2   | 2   | <b>M1</b> for $5^{-2}$ , $\frac{1}{5^2}$   | or [0].04 seen oe                                       |                       |
| 15 |   | radius 3 cm, centre A, not the rectangle      | 2   |  | ull circle centre A ra<br>ect size circle at A o        |                       |
|    | (b) One lin<br>arcs. E.   | ne of symmetry with correct<br>.g.:           | 2   | sides)   | ruled line (must read<br>of intersecting arcs           | ch or cross two       |
| 16 | (a) 8.61 or   | * 8.609 to 8.6102                             | 4   | M1 for $\frac{1}{2} \times 3^2 \times$<br>M1 for $\frac{30}{360} \times 7$   | $\tau \times 3^2 [\times 2]$                            |                       |
| 7  | <b>(b)</b> 430 or   | 431 or 430.4 to 430.41                        | 1FT | FT their (a) $\times$ 5  | triangle + 2 sectors                                    |                       |

|    | Page 4 Mark Sch                          |                |   |  | Syllabus                                       | Paper        |  |
|----|--|----------------|---|--|--|--------------|--|
|    | IGCSE – October/N                        |                |   | vember 2013 0580   |  | 23           |  |
| 17 | (a) triangle at (0, 3) (2, 3) and (2, 4) |                | 3 | <b>B1</b> for each correct vertex<br>If 0 scored then <b>M1</b> for correct reflection in the<br><i>y</i> axis or correct translation of their first stage 3<br>right 2 up |  |              |  |
|    | (b) reflection                           | on in y axis   | 2 | <b>B1</b> for reflection<br><b>B1</b> for y axis or $x = 0$  |  |              |  |
| 18 | <b>(a)</b> 19–19.1                       |                | 1 |  | 2  |              |  |
|    | <b>(b)</b> 3                             |                | 2 | M1 for 47 seen   |  |              |  |
|    | (c) 4.9 to 5                             | .7             | 2 | <b>B1</b> for [UQ] 21  | .7 to 22.2 and [LQ]                            | 16.5 to 16.8 |  |
|    | (d) $\frac{45}{50}$ oe                   |                | 2 | <b>B1</b> for 45 seen<br><b>SC1</b> for $\frac{5}{50}$ isw   |  | )*           |  |
| 19 | <b>(a)</b> 75                            |                | 2 | <b>B1</b> for [g(6) =]   | 36   |              |  |
|    | <b>(b)</b> 3.5 -6.3                      | 5              | 3 | M1 for $(2x + 3)$<br>M1 for $2x + 3 =$   |  |              |  |
|    | (c) $\frac{x-3}{2}$ o<br>(d) 5           | e final answer | 2 |  | 1 for one correct va<br>- 3 or $y - 3 = 2x$ or |              |  |

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