**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**International General Certificate of Secondary Education**

# 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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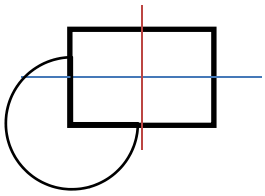
**Abbreviations**

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 $2x = -16$ 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)** 600 000<br>**(b)** 79.2 | **1**<br>**2** | <br>**M1** 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 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** | **M1** for $m = kx^3$<br>**A1** for $k = 25$ |
| **9** | **(a)** $a^2 + 2ab + b^2$<br>**(b)** 22 | **2**<br>**1** | **B1** for $a^2$ [+] $ab$ [+] $ab$ [+] $b^2$ or better seen |
| **10** | 160 | **3** | **M1** for $\sin 15 = \frac{[]}{628}$ oe or better |

| | | | |
|---|---|---|---|
| **11** | **(a)** $\begin{pmatrix} 3 & -1 \\ 4 & 2 \end{pmatrix}$ | **1** | |
| | **(b)** $\frac{1}{10}\begin{pmatrix} 2 & 1 \\ -4 & 2 \end{pmatrix}$ oe | **2** | **B1** for $\frac{1}{10}\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ or **B1** for $k\begin{pmatrix} 2 & 1 \\ -4 & 3 \end{pmatrix}$ |
| **12** | **(a)** $7.5 \times 10^{-2}$ | **2** | **M1** for 0.075 or $\frac{3}{40}$ or $\frac{6}{80}$ or $0.75 \times 10^{-1}$ oe |
| | **(b)** $9.3 \times 10^{7}$ | **2** | **M1** for 93 000 000 or $93 \times 10^{6}$ or $0.93 \times 10^{8}$ oe |
| **13** | **(a)** 24 | **2** | **M1** for $MOC = 48$ |
| | **(b)** 24 | **2** | **M1** for $ACM = 66$<br>or<br>**B1** for 48 – *their* **(a)** |
| **14** | **(a)** $8q^{-1}$ or $\frac{8}{q}$ | **2** | **B1** for $8q^{k}$ or $kq^{-1}$ |
| | **(b)** 1/5 or 0.2 | **2** | **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 | **2** | **M1** for arc or full circle centre A radius 3 cm or for an incorrect size circle at A outside rectangle |
| | **(b)** One line of symmetry with correct arcs. E.g.:<br>  | **2** | **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 | **4** | **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 |
| | **(b)** 430 or 431 or 430.4 to 430.41 | **1FT** | FT their **(a)** × 50 |

| | | | |
|---|---|---|---|
| **17** | **(a)** triangle at (0, 3) (2, 3) and (2, 4) | **3** | **B1** for each correct vertex<br>If 0 scored then **M1** for correct reflection in the *y* axis or correct translation of their first stage 3 right 2 up |
| | **(b)** reflection in *y* axis | **2** | **B1** for reflection<br>**B1** for *y* axis or $x = 0$ |
| **18** | **(a)** 19–19.1 | **1** | |
| | **(b)** 3 | **2** | **M1** for 47 seen |
| | **(c)** 4.9 to 5.7 | **2** | **B1** for [UQ] 21.7 to 22.2 and [LQ] 16.5 to 16.8 |
| | **(d)** $\frac{45}{50}$ oe | **2** | **B1** for 45 seen or<br>**SC1** for $\frac{5}{50}$ isw |
| **19** | **(a)** 75 | **2** | **B1** for [g(6) =] 36 |
| | **(b)** 3.5 –6.5 | **3** | **M1** for $(2x + 3)^2 = 100$<br>**M1** for $2x + 3 = [\pm]10$<br>If 0 scored, **SC1** for one correct value as answer |
| | **(c)** $\frac{x-3}{2}$ oe final answer | **2** | **M1** for $x = 2y + 3$ or $y - 3 = 2x$ or $\frac{y}{2} = x + \frac{3}{2}$ or better |
| | **(d)** 5 | **1** | |