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**CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
International General Certificate of Secondary Education

## **MARK SCHEME for the October/November 2012 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.

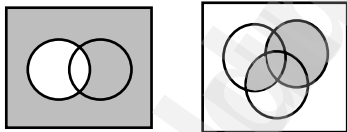
Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2012 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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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      |

|    |                                                                                                                         |                        |                                                                                                                                                                               |
|----|-------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | 96                                                                                                                      | 2                      | <b>M1</b> for $\frac{600 \times 2 \times 8}{100}$ oe<br>If zero <b>SC1</b> 696                                                                                                |
| 2  | $\frac{1}{100} + \frac{4}{25}$ or $0.1^2 + 0.4^2$ oe<br>$\frac{1}{100} + \frac{16}{100} = 0.17$ or $0.01 + 0.16 = 0.17$ | <b>M1</b><br><b>M1</b> | Independent                                                                                                                                                                   |
| 3  | 180                                                                                                                     | 2                      | <b>M1</b> for $\frac{300 \times 12}{20}$ oe                                                                                                                                   |
| 4  | $3y - y^4$ final answer                                                                                                 | 2                      | <b>B1</b> for $3y$ or $-y^4$ as part of two term expression                                                                                                                   |
| 5  | 88.2(0)                                                                                                                 | 2                      | <b>M1</b> for $84 \times 1.05$ oe                                                                                                                                             |
| 6  | Accurate perpendicular bisector of $RT$ with arcs.                                                                      | 2                      | <b>B1</b> for 2 pairs of correct arcs<br><b>B1</b> for correct line                                                                                                           |
| 7  | 8.471 cao                                                                                                               | 2                      | <b>B1</b> for 8.47 or 8.4705 to 8.4706 or $\frac{144}{17}$ or $8\frac{8}{17}$                                                                                                 |
| 8  | 249.5 [ $\leq j <$ ] 250.5 cao                                                                                          | 2                      | <b>B1</b> for either, or both correct but reversed                                                                                                                            |
| 9  |                                      | 2                      | <b>B1</b> for one correct                                                                                                                                                     |
| 10 | Correct working seen                                                                                                    | 2                      | <b>M1</b> for correct step <b>M1</b> for correct step                                                                                                                         |
| 11 | $4w^{64}$                                                                                                               | 2                      | <b>B1</b> for $4w^n$ or $kw^{64}$                                                                                                                                             |
| 12 | 40      6                                                                                                               | 2                      | <b>B1</b> for one correct                                                                                                                                                     |
| 13 | $\frac{23 - 2x}{12}$                                                                                                    | 3                      | <b>M1</b> for two correct algebraic fractions with a common denominator of 12<br><b>M1</b> for correctly collecting their terms<br><b>M1</b> for dealing correctly with the 1 |
| 14 | 3, -3 or $\pm 3$                                                                                                        | 3                      | <b>M1</b> for $y = k/\sqrt{x}$ oe <b>A1</b> for 18                                                                                                                            |

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|    |                                                                                                                                |             |                                                                                                                                                                                                     |
|----|--------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15 | 30 000                                                                                                                         | 3           | <b>M2</b> for $7500 \times 200^2/100^2$ oe<br>or <b>M1</b> for $200^2$ seen                                                                                                                         |
| 16 | $\sqrt{\frac{\pi x^2 - A}{\pi}}$ oe                                                                                            | 3           | <b>M1</b> for one correct move<br><b>M1</b> for second correct move<br><b>M1</b> for third correct move                                                                                             |
| 17 | $10r^2$ cao www                                                                                                                | 3           | <b>B1</b> for $(\frac{\theta}{360} =) \frac{4r}{2 \times \pi \times 5r}$<br><b>M1</b> for $\frac{4r}{2 \times \pi \times 5r} \times (5r)^2 \pi$                                                     |
| 18 | 122.2                                                                                                                          | 4           | <b>M2</b> for $13 \sin 23/6$ <b>A1</b> 57.8<br>or <b>M1</b> for $\frac{\sin 23}{6} = \frac{\sin A}{13}$                                                                                             |
| 19 | (a) 0.625 or 5/8<br>(b) 62                                                                                                     | 1<br>3      | <b>M1</b> for area under graph implied<br><b>M1</b> for correct, complete, area statement                                                                                                           |
| 20 | (a) $\frac{1}{3}(\mathbf{c} - \mathbf{d})$ oe<br>(b) $\frac{1}{3}\mathbf{c} + \frac{2}{3}\mathbf{d}$ oe                        | 2<br>2ft    | <b>M1</b> for $\mathbf{DC} = \mathbf{c} - \mathbf{d}$ oe or correct route<br>Their (a) + d simplified<br><b>M1</b> for any correct route from O to E stated                                         |
| 21 | $\frac{h+4}{h+5}$                                                                                                              | 4           | <b>B2</b> for $(h-5)(h+4)$ seen<br><b>B1</b> for $(h-5)(h+5)$<br>If <b>B2</b> not scored then <b>SC1</b> for $(h+a)(h+b)$ where<br>$a+b=-1$ or $ab=-20$                                             |
| 22 | (a) $\frac{1}{5} \begin{pmatrix} 1 & -2 \\ 1 & 3 \end{pmatrix}$<br>(b)(i) <b>D</b> cao<br>(ii) $\mathbf{D}^{-1}\mathbf{E}$ cao | 2<br>1<br>1 | <b>B1</b> for $\frac{1}{5} \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ or $k \begin{pmatrix} 1 & -2 \\ 1 & 3 \end{pmatrix}$ seen                                                                  |
| 23 | (a) 43<br>(b) $12x + 2$<br>(c) 38                                                                                              | 2<br>2<br>1 | <b>M1</b> for $g(11)$ or $4[4(3) - 1] - 1$<br><b>M1</b> for $3(4x - 1) + 5$                                                                                                                         |
| 24 | (a) 12.7<br>(b) 28.2                                                                                                           | 3<br>3      | <b>M2</b> for $10^2 + 5^2 + 6^2$<br>or <b>M1</b> for one of $10^2 + 5^2$ or $6^2 + 5^2$ or $10^2 + 6^2$<br><b>M2</b> for $\sin x = 6/(\mathbf{a})$<br>or <b>M1</b> for identifying angle <i>PDB</i> |
|    |                                                                                                                                | 70          |                                                                                                                                                                                                     |