

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**GCE Ordinary Level**

## **MARK SCHEME for the May/June 2013 series**

### **4024 MATHEMATICS (SYLLABUS D)**

**4024/11**

Paper 1, maximum raw mark 80

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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| <b>Qu</b>     | <b>Answers</b>        | <b>Mark</b> | <b>Part Marks</b>                                                                 |
|---------------|-----------------------|-------------|-----------------------------------------------------------------------------------|
| <b>1 (a)</b>  | 100                   | 1           |                                                                                   |
| <b>(b)</b>    | 475                   | 1           |                                                                                   |
| <b>2 (a)</b>  | 0.06 oe               | 1           |                                                                                   |
| <b>(b)</b>    | 50                    | 1           |                                                                                   |
| <b>3 (a)</b>  | 3.556                 | 1           |                                                                                   |
| <b>(b)</b>    | 12000                 | 1           |                                                                                   |
| <b>4 (a)</b>  | <                     | 1           |                                                                                   |
| <b>(b)</b>    | (0) . 07              | 1           |                                                                                   |
| <b>5</b>      | 16                    | 2           | B1 for $PX$ or $XQ = 8$ or<br>M1 for $PX^2 = 10^2 - 6^2$ oe                       |
| <b>6</b>      | $\frac{7}{20}$ oe isw | 2           | B1 for $\frac{8+5}{20}$ oe seen                                                   |
| <b>7</b>      | 1 : 60 000            | 2           | C1 for 1 : figs 6 or<br>M1 for 4.5 : 270 000 oe                                   |
| <b>8 (a)</b>  | 148 soi               | 1           |                                                                                   |
| <b>(b)</b>    | $-\frac{12}{13}$      | 1           |                                                                                   |
| <b>9 (a)</b>  | 18                    | 1           |                                                                                   |
| <b>(b)</b>    | 90                    | 2           | M1 for $x - \frac{10}{100}x = 81$ or better or<br>B1 for figs $\frac{81}{9}$ seen |
| <b>10 (a)</b> | 55                    | 1           |                                                                                   |
| <b>(b)</b>    | $\frac{ma-b}{m}$ oe   | 2           | M1 for $b = ma - mc$ or $\frac{b}{m} = a - c$<br>B1 ft for their $c$ after M0     |
| <b>11 (a)</b> | square                | 1           |                                                                                   |
| <b>(b)</b>    | trapezium             | 1           |                                                                                   |
| <b>(c)</b>    | kite                  | 1           |                                                                                   |

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|           |                |                             |   |                                                           |
|-----------|----------------|-----------------------------|---|-----------------------------------------------------------|
| <b>12</b> | <b>(a)</b>     | 619                         | 1 |                                                           |
|           | <b>(b)</b>     | 196                         | 1 |                                                           |
|           | <b>(c)</b>     | 169, 196 or 961             | 1 |                                                           |
| <b>13</b> | <b>(a)</b>     | 25                          | 2 | M1 for a correct area                                     |
|           | <b>(b)</b>     | 1.25 oe                     | 1 | Accept $\frac{(a)}{20}$ ft                                |
| <b>14</b> | <b>(a)</b>     | 32°                         | 1 |                                                           |
|           | <b>(b)</b>     | 26°                         | 1 | Accept $90 - ((a) + 32)$                                  |
|           | <b>(c)</b>     | 58°                         | 1 | Accept $90 - \frac{1}{2}((a) + 32)$                       |
| <b>15</b> | <b>(a) (i)</b> | Bisector of $\widehat{ADC}$ | 1 |                                                           |
|           | <b>(ii)</b>    | Arc radius 5 centre $B$ .   | 1 |                                                           |
|           | <b>(b)</b>     | Correct region shaded.      | 1 |                                                           |
| <b>16</b> | <b>(a)</b>     | 4                           | 1 |                                                           |
|           | <b>(b)</b>     | 5400                        | 2 | C1 for figs 54<br>M1 for $2^3 : 3^3$ seen in any form.    |
| <b>17</b> | <b>(a)</b>     | $6.24 \times 10^3$          | 1 |                                                           |
|           | <b>(b)</b>     | $8 \times 10^{-2}$          | 2 | C1 for figs 8 or for any correct value however expressed. |
| <b>18</b> | <b>(a)</b>     | 30                          | 1 |                                                           |
|           | <b>(b)</b>     | 66                          | 1 |                                                           |
|           | <b>(c)</b>     | 30                          | 2 | M1 for an attempt at $78 - 48$ .                          |
| <b>19</b> | <b>(a)</b>     | $\frac{7\pi}{9}$            | 2 | M1 for $\frac{40}{360}\pi r^2$                            |
|           | <b>(b) (i)</b> | $6\frac{2}{3}\pi$           | 1 |                                                           |
|           | <b>(ii)</b>    | $\frac{11}{15}$             | 1 |                                                           |

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|           |                |                                                             |   |                                                                                                                      |
|-----------|----------------|-------------------------------------------------------------|---|----------------------------------------------------------------------------------------------------------------------|
| <b>20</b> | <b>(a) (i)</b> | 26                                                          | 1 |                                                                                                                      |
|           | <b>(ii)</b>    | 6                                                           | 1 |                                                                                                                      |
|           | <b>(iii)</b>   | 16                                                          | 1 |                                                                                                                      |
|           | <b>(b)</b>     | − 2                                                         | 1 |                                                                                                                      |
| <b>21</b> | <b>(a)</b>     | $(R =) 3p^3$ seen                                           | 1 | M1 for $192 = 3p^3$ oe                                                                                               |
|           | <b>(b)</b>     | 4                                                           | 2 |                                                                                                                      |
|           | <b>(c)</b>     | (Diagram) 2                                                 | 1 |                                                                                                                      |
| <b>22</b> | <b>(a)</b>     | Correct triangle C                                          | 1 | C1 for two vertices correct or for triangle of the correct size and orientation.                                     |
|           | <b>(b)</b>     | Correct triangle D                                          | 2 |                                                                                                                      |
|           | <b>(c)</b>     | $\begin{pmatrix} 1 & 0 \\ 0 & 3 \end{pmatrix}$              | 1 |                                                                                                                      |
| <b>23</b> | <b>(a) (i)</b> | $\frac{4}{6}$ oe                                            | 1 | C1 for one of these.                                                                                                 |
|           | <b>(ii)</b>    | e.g. $y = \frac{4}{6}x + 3$ oe                              | 1 |                                                                                                                      |
|           | <b>(iii)</b>   | $y = 3x + 2$                                                | 1 |                                                                                                                      |
|           | <b>(b)</b>     | $y \geq 2$<br>$y \leq \frac{4}{6}x + 2$                     | 2 |                                                                                                                      |
| <b>24</b> | <b>(a) (i)</b> | $\begin{pmatrix} 6 & 9 \\ 1 & 3 \end{pmatrix}$              | 1 | B1 for $\det = 5$ soi or<br>for $k \begin{pmatrix} 1 & 3 \\ -1 & 2 \end{pmatrix}$<br>B1 for 5 correct with no extras |
|           | <b>(ii)</b>    | $\frac{1}{5} \begin{pmatrix} 1 & 3 \\ -1 & 2 \end{pmatrix}$ | 2 |                                                                                                                      |
|           | <b>(b)</b>     | 1, 2, 3, 4, 6, 8, 12                                        | 2 |                                                                                                                      |
|           | <b>(c)</b>     | $M' \cap N$                                                 | 1 |                                                                                                                      |

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|    |     |                                     |   |                                                                                          |
|----|-----|-------------------------------------|---|------------------------------------------------------------------------------------------|
| 25 | (a) | $5xy(2x + 3y)$                      | 1 |                                                                                          |
|    | (b) | $(5a - b)(5a + b)$                  | 1 |                                                                                          |
|    | (c) | $\frac{1-2x}{(x+1)^2}$ Final Answer | 2 | M1 for $\frac{3-2(x+1)}{(x+1)^2}$ oe                                                     |
|    | (d) | $\frac{ab}{6}$                      | 2 | C1 for any 2 terms correct<br><br>M1 for $\frac{3a^2}{10bc} \times \frac{5b^2c}{9a}$ soi |