

**MARK SCHEME for the May/June 2011 question paper
for the guidance of teachers**

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.

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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 | (a) 147 oe | 1 | |
| | (b) 17 | 1 | |
| 2 | (a) $\frac{9}{50}$ cao | 1 | |
| | (b) $\pi, \sqrt{10}, \dots$ | 1 | |
| 3 | (a) $\frac{29}{30}$ | 1 | |
| | (b) $\frac{8}{15}$ | 1 | |
| 4 | (a) 1 or 25 | 1 | |
| | (b) 216 | 1 | |
| 5 | (a) -24 | 1 | |
| | (b) 102 | 1 | |
| 6 | (a) 4 | 1 | |
| | (b) 36 | 1 | |
| 7 | (a) $A \cup (B \cap C)$ oe | 1 | |
| | (b) Correct region shaded | 1 | |
| 8 | (a) 63 | 1 | |
| | (b) 60 | 1 | |
| 9 | (a) $4ab(3b - 2a)$ | 1 | |
| | (b) $(2x - 5)(x + 4)$ | 2 | |
| 10 | (a) 14 05 or 2 05 pm | 2 | B1 for $\frac{65}{20}$ or M1 for 10 50 + their $3\frac{1}{4}$ |
| | (b) $\frac{100T}{110}$ oe | 1 | |

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| | | | |
|-----------|--|-----|---|
| 11 | (a) $-\frac{3}{2}$ oe | 1 | |
| | (b) $x = 1$ $y = 2$ $2y = 9 - 3x$ | 2 | C1 for 2 of these or B1 for $x = 1, y = 2$ and $2y = 9 - 3x$ () may contain =, < etc |
| 12 | (a) Showing $180 - 36$ | 1 | |
| | (b) 96 | 2 | B1 for the angle of a regular hexagon or M1 for $360 - (\text{their } 144 + \text{their } 120)$ |
| 13 | (a) 31 | 1 | |
| | (b) 6 | 1 | |
| | (c) 5 | 1 | |
| 14 | (a) 12 000 | 2 | B1 for two of 8, 300, 0.2 seen |
| | (b) 9.575 | 1 | |
| 15 | (a =) 8.75 oe | 3 | C2 for one correct www or B1 for $\frac{4}{7}$ or $\frac{7}{4}$ oe seen |
| | (b =) 6 oe | | |
| 16 | (a) $(x) = \frac{1}{4}$ or 0.25 | 1 | |
| | (b) $(x =) \frac{2}{3}$ or -3 | 3 | C2 for either www or M2 for $5x(x - 1) - 2(x + 1) = 8(x + 1)(x - 1)$ soi or M1 for $\frac{5x(x - 1) - 2(x + 1)}{(x + 1)(x - 1)}$ soi |
| 17 | (a) 38 | 1 | |
| | (b) 104 | 1ft | ft $180 - 2 \times \text{their (a)}$ |
| | (c) 122 | 1 | |
| | (d) 84 | 1ft | ft their (c) - 38 |
| 18 | (a) 79 cao | 1 | |
| | (b) $n(n + 1) + (n + 2)^2$ oe | 1 | |
| | (c) $(A =) 2, (B =) 5, (C =) 4$ | 2 | C1 for two of these or M1 for three correct equations or comparison with their (b) |

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| | | | |
|-----------|--|-----|--|
| 19 | (a) (i) 3.6×10^{-6} | 1 | |
| | (ii) 3.6×10^{-3} oe | 1ft | ft their (i) $\times 10^3$ |
| | (b) 3700 | 2 | M1 for correct removal of brackets or for division by 2×10^3 |
| 20 | (a) 3 | 1 | |
| | (b) $\frac{3+2x}{x}$ oe | 2 | M1 for $yx - 2y = 3$ or $xy - 2x = 3$ soi |
| | (c) 4 | 2 | M1 for $2t - 5 = 3$ soi |
| 21 | (a) Tree diagram correct | 2 | C1 for $\frac{1}{3}$ and $\frac{2}{3}$ or $\frac{4}{5}, \frac{1}{5}, \frac{4}{5}$ and $\frac{1}{5}$ |
| | (b) $\frac{4}{15}$ | 1 | |
| | (c) $\frac{1}{15}$ | 2 | M1 for $1 - \left(\frac{2}{3} \times \frac{4}{5} + \frac{2}{3} \times \frac{1}{5} + \frac{1}{3} \times \frac{4}{5} \right)$ or B1 for their $\frac{1}{3}$ and their $\frac{1}{5}$ seen |
| 22 | (a) $1200 + 450\pi$ | 2 | C1 for one correct term B1 for using πr^2 correctly |
| | (b) $40 + 10\pi$ oe | 3 | B1 for using $2\pi r$ correctly and B1 for $20 + 20$ |
| 23 | (a) Correct triangle with sides 8 and 6 | 2 | B1 for correct triangle without arcs or arcs seen but only one correct side or sides reversed |
| | (b) (i) Bisector of ABC | 1 | |
| | (ii) Circular arc | 1 | |
| | (c) Correct region shaded | 1 | |
| 24 | (a) 4 –5 | 2 | C1 for one correct |
| | (b) 6 correct plots ft and curve | 2ft | C1 for at least 4 plots and “curve” |
| | (c) (i) 0 cao 2.4 to 2.5 ft | 2 | C1 for either |
| | (ii) ft from graph | 1ft | |