

MARK SCHEME for the May/June 2015 series

4024 MATHEMATICS (SYLLABUS D)

4024/11

Paper 1, maximum raw mark 80

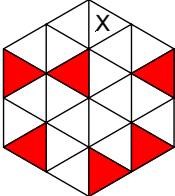
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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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| Qu | Answers | Mark | Part Marks |
|-------|---|------|--|
| 1 (a) | $1\frac{17}{24}, \frac{41}{24}$ oe | 1 | |
| (b) | 3.2 oe | 1 | |
| 2 (a) |  | 1 | |
| (b) | Correct centre marked and order = 3 | 1 | |
| 3 (a) | $\frac{3}{80}$ cao | 1 | |
| (b) | $\frac{3}{4}, \frac{31}{40}, \frac{4}{5}$ | 1 | |
| 4 (a) | (0).0044(00....) | 1 | |
| (b) | (\pm) 5 | 1 | |
| 5 (a) | 1.6×10^{11} | 1 | |
| (b) | 7.4×10^6 | 1 | |
| 6 | 2.2, or $2\frac{1}{5}$, only | 2 | M1 for figs 22, or $\frac{\text{figs 11}}{\text{figs 5}}$ |
| 7 | Correct frequency polygon | 2 | B1 for linear vertical scale and 5 or 6 correct heights. B1 for plots at the midpoints of the intervals, and joined by straight lines. After B0 , allow SC1 for 4 or 5 correct plots (i.e. correct midpoints and heights). |
| 8 | 6 7 8 | 2 | B1 for $n < 8...$, or for $n > 5...$ or B1 for 2 correct integers only or for 3 correct integers and one incorrect |
| 9 | $\frac{12}{25}$ oe | 2 * | B1 for “k” = 12 or M1 for $3 \times 2^2 = y \times 5^2$ oe or (their k) / 5 ² oe |
| 10 | (1 8) | 2 | C1 for one correct element in a 1×2 matrix |

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| 11 | $\frac{2x^2+1}{x(x+1)}$, or $\frac{2x^2+1}{x^2+x}$ Final answer | 3 | B1 for denom. = $x(x+1)$ oe and B1 for num. = $1(x+1) + 2x(x+1) - 3x$ oe soi |
| 12 (a) | $\frac{1}{9}$ | 1 | |
| (b) | $(\pm) 3$ | 1 | |
| (c) | 10 | 1 | |
| 13 (a) | 4.5, or any equiv. | 1 | |
| (b) | 22.5, or any equiv. | 2 | M1 for $10 \times \left(\frac{a}{b}\right)^2$, where a and b are corresponding sides, possibly cancelled down, with $a > b$. |
| 14 (a) | Acceptable line | 1 | |
| (b) | 2 : 3 : 4 | 1 | |
| (c) | 54 | 1 | |
| 15 (a) | (6, 2) | 1 | |
| (b) | square cao | 1 | |
| (c) | 25 cao | 1 | |

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|------------|---|-------|---|
| 16 (a) | $\begin{pmatrix} -2 & -1 \\ -1 & 5 \end{pmatrix}$ | 1 | |
| (b) | $\begin{pmatrix} \frac{3}{8} & \frac{1}{8} \\ -\frac{5}{8} & \frac{1}{8} \end{pmatrix}$ or $\frac{1}{8}\begin{pmatrix} 3 & 1 \\ -5 & 1 \end{pmatrix}$ | 2 | B1 for $\begin{pmatrix} 3 & 1 \\ -5 & 1 \end{pmatrix}$ seen or B1 for (determinant =) 8 seen |
| 17 (a) | $3(1 - 2a)(1 + 2a)$ | 2 * | B1 for $3(1 - 4a^2)$ or $(1 - 2a)(1 + 2a)$ seen |
| (b) | $(x - 3)(x + 2y)$ | 2 * | B1 for any (partial) factorisation of $x^2 + 2xy$; $x^2 - 3x$; $-6y + 2xy$; $-6y - 3x$ |
| 18 (a) (i) | 3 | 1 | |
| (ii) | 42, 48 | 1 | |
| (b) | smallest = 11 largest = 19 | 2 | M1 for Venn diagram with $n - 11$, 11 and 6 correctly placed or $n - 11 + 11 + x + 6 = 25$ so Or B1 for either answer correct Or C1 for reversed answers |
| 19 (a) | 47 | 1 | |
| (b) | 34 | 1 | |
| (c) | 22 | 1 | |
| (d) | 77 | 1 | Ft from (a) and (b) ie $111 - y$ or $158 - (x + y)$ |
| 20 (a) (i) | 220° | 1 | |
| (ii) | 130° | 1 | |
| (iii) | $(0)40^\circ$ | 1 | |
| (b) | 7 | 1 | |
| 21 (a) | Correct region identified | 2 | B1 for the lines $x = 1$ and $x = 5$ or the lines $y = 2$ and $y = 4$ |
| (b) (i) | Line parallel to L , through top left hand point of R | 1 | |
| (ii) | 3.5 to 4 (inclusive) | 1 dep | Mark dep on 1 mark scored in b)i) |
| 22 (a) | Acceptable D and completion of quad $ABCD$ | 1 | |
| (b) (i) | Perpendicular bisector of BC | 1 | |
| (ii) | Bisector of angle ABC | 1 | |

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| (c) | $DP = 5.4$ to 5.9 cm (inclusive) | 1 | Dependent on two acceptable intersecting loci |
| 23 (a) | 1450 | 1 | |
| (b) | 2.2 (minutes) oe | 1 | |
| (c) (i) | Line from (3, 2000) to (13, 0) | 1 | |
| (ii) | 12 | 1 | |
| 24 (a) | scale factor = -2 and centre = (0, 2) soi | 2 | B1 for either |
| (b) | triangle with vertices (3, 1), (4, 1), (7, 3) | 2 | C1 for two correct vertices, or for triangle with vertices (1, 3), (1, 5), (2, 5) |
| 25 (a) | Correct third ball branches with $\frac{1}{3}$ and $\frac{2}{3}$ and correct fourth ball branch(es) with (0 and) 1 | 2 | B1 for either |
| (b) (i) | $\frac{3}{10}$ oe | 1 | |
| (ii) | $\frac{1}{2}$ oe | 2 | B1 for $\frac{3}{5} \times \frac{2}{4} \times \text{their} \left(\frac{2}{3} \right)$ seen |
| 26 (a) | $\frac{1}{10 \times 11} = \frac{1}{10} - \frac{1}{11}$ | 1 | |
| (b) (i) | $\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \frac{1}{4 \times 5} = \frac{1}{1} - \frac{1}{5} = \frac{4}{5}$ | 1 | |
| (ii) (a) | $\frac{19}{20}$ | 1 | |
| (b) | 109 | 1 | |
| (c) | $\frac{n}{n+1}$ oe | 1 | |