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Cambridge Ordinary Level

MARK SCHEME for the May/June 2015 series

4024 MATHEMATICS (SYLLABUS D)

4024/11 Paper 1, maximum raw mark 80

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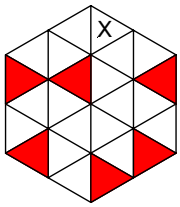
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Qu	Answers	Mark	Part Marks
1 (a)	$1\frac{17}{24}$, $\frac{41}{24}$ oe	1	
(b)	3.2 oe	1	
2 (a)		1	
(b)	Correct centre marked and order = 3	1	
3 (a)	$\frac{3}{80}$ cao	1	
(b)	$\frac{3}{4}$ $\frac{31}{40}$ $\frac{4}{5}$	1	
4 (a)	(0).0044(00….)	1	
(b)	(±) 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)	(±) 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 $n - 11 + 11 + x + 6 = 25$ soi 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°	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)	1dep	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 $\frac{3}{5}\times\frac{2}{4}\times their\left(\frac{2}{3}\right)$ seen
26 (a)	$\frac{1}{10\times11}=\frac{1}{10}-\frac{1}{11}$	1	
(b) (i)	$\frac{1}{1\times2}+\frac{1}{2\times3}+\frac{1}{3\times4}+\frac{1}{4\times5}=\frac{1}{1}-\frac{1}{5}=\frac{4}{5}$	1	
(ii) (a)	$\frac{19}{20}$	1	
(b)	109	1	
(c)	$\frac{n}{n+1}$ oe	1	

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