

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
Cambridge Ordinary Level

**MARK SCHEME for the May/June 2015 series**

**4024 MATHEMATICS (SYLLABUS D)**

**4024/11**

Paper 1, maximum raw mark 80

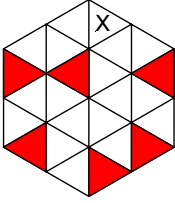
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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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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)	$1.6 \times 10^{11}$	1	
(b)	$7.4 \times 10^6$	1	
6	2.2, or $2\frac{1}{5}$ , only	2	<b>M1</b> for figs 22, or $\frac{\text{figs } 11}{\text{figs } 5}$
7	Correct frequency polygon	2	<b>B1</b> for linear vertical scale and 5 or 6 correct heights. <b>B1</b> for plots at the midpoints of the intervals, and joined by straight lines. After <b>B0</b> , allow <b>SC1</b> for 4 or 5 correct plots (i.e. correct midpoints and heights).
8	6 7 8	2	<b>B1</b> for $n < 8...$ , or for $n > 5...$ or <b>B1</b> for 2 correct integers only or for 3 correct integers and one incorrect
9	$\frac{12}{25}$ oe	2 *	<b>B1</b> for “k” = 12 or <b>M1</b> for $3 \times 2^2 = y \times 5^2$ oe or (their k) / 5 <sup>2</sup> oe
10	( 1 8 )	2	<b>C1</b> for one correct element in a $1 \times 2$ matrix

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<b>11</b>	$\frac{2x^2+1}{x(x+1)}$ , or $\frac{2x^2+1}{x^2+x}$ Final answer	3	<b>B1</b> for denom. = $x(x+1)$ oe and <b>B1</b> for num. = $1(x+1) + 2x(x+1) - 3x$ oe soi
<b>12 (a)</b>	$\frac{1}{9}$	1	
<b>(b)</b>	$(\pm) 3$	1	
<b>(c)</b>	10	1	
<b>13 (a)</b>	4.5, or any equiv.	1	
<b>(b)</b>	22.5, or any equiv.	2	<b>M1</b> for $10 \times \left(\frac{a}{b}\right)^2$ , where $a$ and $b$ are corresponding sides, possibly cancelled down, with $a > b$ .
<b>14 (a)</b>	Acceptable line	1	
<b>(b)</b>	2 : 3 : 4	1	
<b>(c)</b>	54	1	
<b>15 (a)</b>	( 6, 2 )	1	
<b>(b)</b>	square cao	1	
<b>(c)</b>	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	<b>B1</b> for $\begin{pmatrix} 3 & 1 \\ -5 & 1 \end{pmatrix}$ seen or <b>B1</b> for (determinant =) 8 seen
17 (a)	$3(1 - 2a)(1 + 2a)$	2 *	<b>B1</b> for $3(1 - 4a^2)$ or $(1-2a)(1+2a)$ seen
(b)	$(x - 3)(x + 2y)$	2 *	<b>B1</b> 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	<b>M1</b> for Venn diagram with $n - 11$ , 11 and 6 correctly placed or $n - 11 + 11 + x + 6 = 25$ so Or <b>B1</b> for either answer correct Or <b>C1</b> 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)	$220^\circ$	1	
(ii)	$130^\circ$	1	
(iii)	$(0)40^\circ$	1	
(b)	7	1	
21 (a)	Correct region identified	2	<b>B1</b> 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	<b>B1</b> for either
(b)	triangle with vertices (3, 1), (4, 1), (7, 3)	2	<b>C1</b> 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	<b>B1</b> for either
(b) (i)	$\frac{3}{10}$ oe	1	
(ii)	$\frac{1}{2}$ oe	2	<b>B1</b> for $\frac{3}{5} \times \frac{2}{4} \times their \left(\frac{2}{3}\right)$ 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	