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Cambridge Ordinary Level

MARK SCHEME for the October/November 2015 series

4024 MATHEMATICS (SYLLABUS D)

4024/12 Paper 1, maximum raw mark 80

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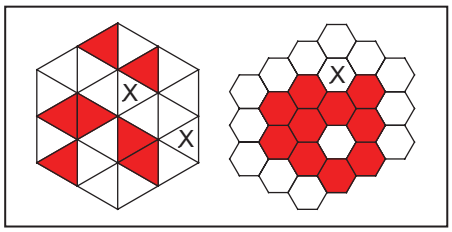
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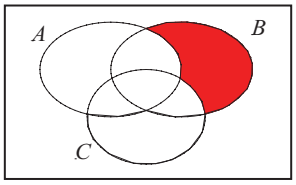
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Question	Answers	Mark	Part marks
1 (a)	0.009(0...)	1	
(b)	1.8	1	
2 (a)	59.3(0)	1	
(b)	90	1	
3	(±) 12 WWW	2 *	**B1** for "k" = (±) 6, from y = "k"$\sqrt{x}$ or **M1** for $18 \times \sqrt{4} = y \times \sqrt{9}$ oe or **M1** for (*their k*) × $\sqrt{4}$ oe provided y = "k"$\sqrt{x}$ used
4 (a)	$-\frac{3}{5}$, or –0.6	1	
(b)	$\frac{x-1}{4}$ oe	1 (*)	
5 (a)	0.0505	1	
(b)	0.06(0)(0) oe from 9, 0.2 and 30	1 *	
6	$\begin{pmatrix} -2 & -1 \\ -1 & 5 \end{pmatrix}$	2	**C1** for 2 or 3 correct elements
7 (a) **(b)**		1 1	
8	d, a, b, e, c	2	**C1** for four correct when one is covered up
9 (a)	55	1	
(b)	6.5, or FT 61.5 – *their(a)*	1	
10 (a)	4.5×10^{-6}	1	
(b) (i)	2.4×10^{16}	1	
(ii)	5.6×10^{8}	1	
11 (a)	1	1	
(b)	$\frac{2}{3}$	1	
(c)	$81x^6$	1	

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Question	Answers	Mark	Part marks
12 (a)	$2 \times 3^2 \times 11$ oe	1	
(b) (i)	12, or $2^2 \times 3$	1	
(ii)	90, or $2 \times 3^2 \times 5$	1	
13	$x = 45$ $y = 20$ $z = 115$	1 1 1	
14 (a)	20	1	
(b)	1 WWW	2 *	**M1** for $\frac{(80+45)}{25}$ or for $25 = \frac{45+80}{4+t}$ oe or **B1** for *total time* = 5 hours
15 (a)		1	
(b) (i)	6	1	
(ii)	10, 14, 16	1	
16 (a) (i)	$(2p - 3q)(2p + 3q)$	1 (*)	
(ii)	$(2n - 1)(n + 3)$	1 (*)	
(b)	$\frac{9y+8x}{12xy}$	1	
17 (a)	28	1	
(b)	62	1	
(c)	48 or FT 110 – *their (b)*	1 √	
18 (a)	$x > 3$; $y < 6$; $y > x + \frac{1}{2}$; oe all three	2	**C1** for 2 correct; or for $x \geqslant 3$; $y \leqslant 6$; $y \geqslant x + \frac{1}{2}$; oe all three
(b)	5	1	or for one correct strict inequality, **and** the other two correct, but with equality as well.

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Question	Answers	Mark	Part marks
19	12 WWW	3 *	**M1** for starting to solve the problem correctly, using exterior angles sum = 360 or interior angles sum = $180 \times 3x - 360$ oe **and A1** for correct equation(s) in *their* variable(s), e.g. $2x(180 - 155) + x(180 - 140) = 360$ oe or $155 \times 2x + 140 \times x = 180 \times 3x - 360$ oe $(n-2)\times 180 = n \times \left(\frac{2\times 155+140}{3}\right)$ oe $n \times [180 - \left(\frac{2\times 155+140}{3}\right)] = 360$ oe $450x = 180(n-2)$ **and** $n = 3x$ **or M2** for a complete method, clearly explained, that does not use algebra
20 (a) (i)	65.4	1	
(ii)	64	1	
(iii)	160	1	
(b)	Parallel CF curve from (62, 0) to (72, 400)	1	
21 (a)	(0)96 to (0)98	1	
(b) (i)	Perpendicular bisector of *BC*.	1	
(ii)	Bisector of angle *ABC*.	1	
(c)	*DA* = 80 to 84 km	1	Dependent on two acceptable intersecting loci
22 (a)	$(4, -\frac{1}{2})$	1	
(b)	$\frac{5}{6}$	1	
(c) (i)	4	1	
(ii)	–2.5, or any equiv.	1	
23 (a)	$\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$	1	
(b) (i)	5 6 7 8	1	
(ii)	$\left(\frac{15}{16}\right)$ $\frac{10}{16}$ $\frac{3}{16}$ 0 or FT from *their (bi)* table	1 √	

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Question	Answers	Mark	Part marks
(c)	$\frac{7}{16}$ oe WWW	2 *	**M1** for $\frac{1}{4}$ × (sum of (bii) table) oe, or for $\sum xy$, attempt, where x and y are corresponding values in the two tables
24 (a)	43 47 cao	1	
(b)	997	1	
(c)	(–)10	1	
(d)	407	1	
(e)	39	1	
25 (a)	1.5	1	
(b)	$15k - 75$; or $15(k - 5)$	2 *	**M1** for $\frac{1}{2} \times 10 \times 15 + (k - 10) \times 15$ oe seen
(c) (i)	Horizontal line from (0, 12), going to, or beyond, $t = k$.	1	
(ii)	25 WWW or FT for correctly solving $12k =$ *their (b)*, provided $k > 10$	1 * √	
26 (a)	$\begin{pmatrix} 2 & 2 & 8 \\ 0 & 1 & 3 \end{pmatrix}$	2	**C1** for 4 or 5 correct elements in a 2 × 3 matrix
(b) (i)	$\frac{1}{2}\begin{pmatrix} 1 & 0 \\ 0 & 2 \end{pmatrix}$ or any equiv seen	1 *	
(ii)	$\begin{pmatrix} 1 & 2 \\ 0 & 1 \end{pmatrix}$, or $\frac{1}{2}\begin{pmatrix} 2 & 4 \\ 0 & 2 \end{pmatrix}$	2 *	**M1** for $\mathbf{M}\begin{pmatrix} 2 & 0 \\ 0 & 1 \end{pmatrix} = \begin{pmatrix} 2 & 2 \\ 0 & 1 \end{pmatrix}$ oe or $\begin{pmatrix} a & b \\ c & d \end{pmatrix}\begin{pmatrix} 2 & 0 \\ 0 & 1 \end{pmatrix}\begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 3 \end{pmatrix}$ = *their (a)* oe

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