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Cambridge Ordinary Level

MARK SCHEME for the May/June 2015 series

4024 MATHEMATICS (SYLLABUS D)

4024/12 Paper 1, maximum raw mark 80

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Question	Answers	Mark	Part Marks
1 (a)	21	1	
(b)	$\frac{9}{20}$ oe	1	
2	$\frac{7}{12}$ $\frac{5}{8}$ 0.64 $\frac{13}{20}$ 0.7	2	**B1** for 3 correct Or completely reversed answer Or **SC1** for 0.65, 0.583, 0.625 seen
3	4	2	**M1** for $\frac{1}{2} \times 12 \times (b + 4b)$ oe Or **B1** for correct use of $\frac{1}{2}(a + b)h$
4	11	2	**B1** for answer $\frac{11}{60}$ Or $\frac{5}{12} \times 60$ **and** $\frac{2}{5} \times 60$ soi
5	3 hours 30 minutes	2	**B1** for 20 55 oe seen Or **M1** for 12 25 – (05 25 – 5) Or (12 25 + 5) – 05 25 soi
6	500	2	**B1** for two from 30, 2 and 0.9 seen
7	$\frac{96}{64}$ oe isw	2	**B1** for $k = 96$ soi Or **M1** for $24 \times 2^2 = y \times 8^2$ Or y = (their k)/8^2
8 (a)	p, q, r, s, t, u	1	
(b)	s, v	1	
9 (a)	5.21×10^{-6}	1	
(b)	3×10^5	1	
10	$p = 3.8$ $q = 77°$	2	**B1** for one correct

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11	(1, 6) (1, 5) (1, 4)	2	**B1** for 2 correct no extras Or 3 correct no more than 5 extras After **B0** allow **SC1** for lines $x = 2$ and $y = 7$ drawn on the diagram
12 (a)	–2	1	
(b) (i)	–3	1	
(ii)	–8, 8	1	Both correct
13 (a)	$2^2 \times 3 \times 5$	1	
(b)	15	1	
(c)	9	1	
14 (a)	Correct triangle with arcs	2	**B1** for correct triangle with no arcs or 1 arc After B0 allow **SC1** for triangle with arcs with 5 cm and 6 cm reversed
(b)	128 to 133°	1	
15 (a)	6	1	
(b)	$b = \frac{8a - c^2}{3}$ oe	2	**M1** for $c^2 = 8a - 3b$
16 (a) (i)	9	1	
(ii)	$\frac{1}{3}$	1	
(b)	$\frac{1}{16x^4}$	1	
17 (a)	Stretch y-axis invariant/parallel to x-axis **and** factor 4	2	**B1** for Stretch
(b)	$\frac{x}{4}$	1	
18 (a)	$pq(p - 1)$	1	
(b) (i)	$(5x - 4)(x + 1)$	1	
(ii)	0.8 oe , –1	1	Or FT their factorisation

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19 (a)	1240	2	**M1** for $8 \times 140 + 10 \times (8 + \frac{50}{100} \times 8)$ isw After **B0** allow **SC1** for answer of 1160 or 1280
(b)	276	2	**B1** for $240 \times 0.03 \times 5$ oe seen
20 (a) (i)	27 cao	1	
(ii)	5 cao	2	**B1** for 30 ± 0.2 and 25 ± 0.2 seen
(b)	Median 28, IQR = 5	1	FT their **(a)(i)** + 1 and their **(a)(ii)**
21 (a)	$\begin{pmatrix} -1 & 9 \\ -5 & 13 \end{pmatrix}$	2	**B1** for 2 or 3 correct elements
(b) (i)	2.5 oe	1	
(ii)	$0.5\begin{pmatrix} -1 & 2 \\ -2.5 & 3 \end{pmatrix}$ isw oe	1	FT their **(b)(i)** If 0 scored in **(b)(i)** and **(b)(ii)** **SC1** for correct FT adjoint matrix $\begin{pmatrix} -1 & 2 \\ -their(bi) & 3 \end{pmatrix}$ isw
22 (a)	0.25	1	
(b)	32	1FT	FT 8 ÷ their **(a)** soi
(c)	1.9	2FT	FT 7.6 × their **(a)** **M1** for figs their **(a)** × figs 76 soi

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23	**(a)**	$\frac{1}{2} \leqslant x < 6$ isw	2	**B1** for $x < 6$ **or** $x \geqslant \frac{1}{2}$ Or for $2x < 12$ **and** $2x \geqslant 1$ Or for $x = 6$ **and** $x = \frac{1}{2}$
	(b)	$x = 5, y = -3$	3	**B2** for either x or y correct with supporting working Or **M1** for correct method to eliminate one variable. And **A1FT** for correct evaluation to find the other variable Or after **B0** scored, allow **SC1** for 2 correct values but no working shown or correct substitution and evaluation to find the other variable using one of the original equations
24	**(a)**	$h = 4r$	2	Answer only is 0. **M1** for either version of the full method, that can be accepted in the form $2 \times \frac{2}{3}\pi r^3 = \frac{1}{3}\pi r^2 h$ or $\frac{4}{3}\pi r^3 = \frac{1}{3}\pi r^2 h$ After **B0**, allow **SC1** for $h = r$
	(b)	17	2FT	**M1** for (their h)$^2 + r^2$
	(c)	$\pi r^2(2 + \sqrt{17})$ oe	1FT	FT $\pi r^2(2 + \sqrt{their 17})$
25	**(a)** **(i)**	$\mathbf{b} - \mathbf{a}$	1	
	(ii)	$3\mathbf{b} - 2\mathbf{a}$	1	
	(b) **(i)**	$\frac{4}{3}\mathbf{a}$	2FT	**M1** for such as $\overrightarrow{BO} + \overrightarrow{OC} + \overrightarrow{CE}$ Or $BD - ED$ or $-b + a + AE$ Or **B1** for $(\overrightarrow{CE}) = \pm \frac{1}{3}$ their **(a)(ii)** Or $(\overrightarrow{DE}) = \pm \frac{2}{3}$ their **(a)(ii)**
	(ii)	trapezium	1	
26	**(a)** **(i)**	$95 - 6n$ oe isw	2	**B1** for $-6n$ seen
	(ii)	16 cao	1	
	(b) **(i)**	$2n - 3$	2	**M1** for $(n + 1)^2 - 4(n + 1)$ seen
	(ii)	39 cao	1	

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