Cambridge
O Level

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Cambridge Ordinary Level

MATHEMATICS (SYLLABUS D) **4024/12**

Paper 1 **October/November 2016**

MARK SCHEME

Maximum Mark: 80

Published

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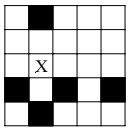
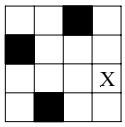
Question	Answers	Mark	Part marks
1 (a)	2.457	1	
(b)	$\frac{2}{63}$ oe fraction; or 0.031 to 0.032	1 (*)	
2 (a)	123.456	1	
(b)	(0).0643	1	
3 (a)		1	
(b)		1	
4 (a)	2.05	1	
(b)	$-\frac{3}{4}$ –0.7 74% $0.\dot{7}$	1	
5 (a)	41°	1	
(b)	245°	1	
6	$\sqrt{3.98} \approx \sqrt{4}$ or 2, and 602.3 ≈ 600 (or 602), and 2.987 ≈ 3 all three seen (±)400 (or 401, 401.3 or better, from 602)	**M1*** **A1**	**B1** for two correct approximations. Could be implied by 2×200 or 1 200/3. **C1** for 400 WAW.
7	Triangle with vertices (1, 1) (1, 5) (7, 5)	2*	**B1** for two correct vertices
8 (a)	5.13×10^{5}	1	
(b)	2.4×10^{-8}	2*	**C1** for $A \times 10^{-8}$ with $1 \leqslant A < 10$ or for 2.4×10^{-10}; or **B1** for 24×10^{-9} or for 0.000 000 024
9 (a)	20 25	1 1	
(b)	Rectangle with base 35 to 50 and height 2	1	

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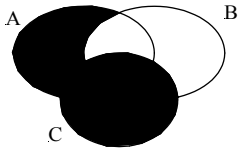
Question	Answers	Mark	Part marks
10 (a)	–3.5 or any equivalent	1	
(b)	$\frac{1}{3}$	2*	**M1** for $5 = 4 + 3x$ or **B1** for ($f^{-1}(x)$ =) $\frac{x-4}{3}$ oe or **B1** for $x = \frac{1}{3}$, followed by further work
11 (a)	4 nfww	2*	**B1** for "k" = 36 from $y = k/x^2$ or **M1** for $9 \times 2^2 = y \times 3^2$ oe or **M1** for (*their k*) / 3^2 oe
(b)	$\frac{p}{4}$	1	
12 (a)	0	1	
(b)	0.8 oe	2*	**M1** for $(15\times1 + 6\times2 + 3\times3 + 4\times1)/50$
13	Correct triangle	3*	Following an attempt at a rotation of 110° about O, award **C2** for two correct vertices or **C1** for one correct vertex. If [0] scored then either **B1** for arc(s) of correct radii, centre O, (from A, B or C); or **B1** for AOA' or BOB' or COC' = 110°
14 (a)		1	
(b)	8	2*	**M1** for 23 + 17 – (36 – 4) or **M1** for $23 - x + x + 17 - x + 4 = 36$ oe or **B1** for S ∩ F' = 15 or F ∩ S' = 9
15	A correct method to eliminate one variable Either $x = 5$ or $y = -6$ WWW Both $x = 5$ and $y = -6$ WWW	* **M1** **A1** **A1**	If [0] earned, then award **C1** for a pair of values that satisfy either equation. If only **M1** earned, then award **B1** for a *correct* substitution of their first solution into one, or a *correct* linear combination of both, of the *original* equations.

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Question	Answers	Mark	Part marks
16 (a)	13	1	
(b)	$(\pm)\frac{9}{16}$	1	
(c)	$4y^3$	1	
17 (a)	200	1	
(b)	15 : 1	2*	**C/B1** for any correct unsimplified ratio, e.g. 210 : 14; 105 : 7; $\frac{30}{2}$: 1; $\frac{7}{2}:\frac{14}{60}$; 3.5 : 14/60 or **M1** for 3.5×60×60 : 14×60; 3.5×60 : 14 or **B1** for 3½ hrs = $\frac{7}{2}\times 60$; or 210 seen.
18 (a)	<table><tr><td>–</td><td>3</td><td>4</td><td>5</td></tr><tr><td>3</td><td>–</td><td>5</td><td>6</td></tr><tr><td>4</td><td>5</td><td>–</td><td>7</td></tr><tr><td>5</td><td>6</td><td>7</td><td>–</td></tr></table>	1	
(b)	0	1	
(c)	$\frac{4}{12}$ oe ; or FT *their table*	1√	
19 (a)	1.65	1	
(b)	15.15	2*	**M1** for *their(a)* + 100 × 135/1000 or **B1** for 13.5 seen.
20	$3(2x-1)+4(x-2)$; or $6x-3+4x-8$; or $10x-11$	**M1***	
	their$(10x-11)=24$ or $\frac{\textit{their}(10x-11)}{12}=2$	**M1***	
	3.5 oe WWW	**A1**	

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Question	Answers	Mark	Part marks
21	600 WWW	**3***	**M2** for $\frac{\pi \times 20^2 \times 16}{\frac{4}{3} \times \pi \times 2^3}$ or **B1** for (Volume of water =) $\pi \times 20^2 \times 16$ or for (Volume of one drop =) $\frac{4}{3} \times \pi \times 2^3$ soi
22 (a)	Perpendicular bisector of *AB*.	1	
(b)	Bisector of angle *ABC*.	1	
(c)	Correct (bottom right) region shaded.	1 √	FT for two intersecting lines – slightly inaccurate but correct types of loci.
23 (a)	14	2*	**M1** for $25 - 1\times1 - 2\times2 - \frac{1}{2}\times4\times3$ oe dissection.
(b)	18 nfww	2*	**B1** for sloping side = 5
24 (a)	68	1	
(b)	146	1	
(c)	34; or FT *their* (a)/2; or FT 180 – *their*(b)	1 √	
(d)	56	1	
25 (a)	$(0,\ 4\frac{1}{3})$	1	
(b)	$x \geqslant 1$ oe, $y \geqslant 2$ oe, $3y + 2x \geqslant 13$ oe – all three	2	**C1** for one or two correct, or for x ... 1 oe, y ... 2 oe, $3y + 2x$ ... 13 oe, with incorrect "..." .
(c)	(6, 2)	1	
26 (a) (i)	$2n - 1$ oe	1	
(ii)	421	1	
(b) (i)	8	1	
(ii)	14	1	

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Question	Answers	Mark	Part marks
27 (a)	(–)0.9 oe	1	
(b)	420	2*	**M1** for $\frac{1}{2}\times 20\times(12+30)$ oe
(c)	25	2*	**M1** for $(k-20)\times 12 = 60$ oe or **C1** for $k = 5$

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