Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

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

Paper 1 **May/June 2017**

MARK SCHEME

Maximum Mark: 80

Published

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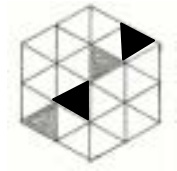
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Question	Answer	Marks	Partial Marks
1(a)	$\frac{7}{15}$	**1**	
1(b)	0.0012 oe	**1**	
2(a)		**1**	
2(b)		**1**	
3	0.03 or $\frac{3}{100}$ with 60, 4 and 20 seen	**2**	**B1** for two from 60, 4 and 20 seen related to unrounded values
4	700	**2**	**C1** for answer 900 or **M1** for $\frac{200}{80}\times(360-80)$ oe
5(a)	137	**1**	
5(b)	085	**1**	
6(a)	–7.5	**1**	
6(b)	17	**1**	**FT** 9.5 – *their* **(a)**, where $-9 \leqslant$ *their* **(a)** $\leqslant -7$
7(a)	$A \cap B'$ oe	**1**	
7(b)	$\subset$	**1**	
8(a)	2 hours 45 minutes	**1**	
8(b)	17 [May]	**2**	**C1** for answer 16 [May] or **M1** for $\frac{10\times1000}{30\times20}$ oe
9(a)	–1, 0, 1	**1**	
9(b)	Correct fraction	**1**	E.g. $\frac{2}{3}, \frac{3}{5}, \frac{5}{8}, \frac{7}{10}, \frac{6}{10}$ etc.
9(c)	Irrational number between 2 and 3	**1**	E.g. $\sqrt{5}$, $\frac{2\pi}{3}$ etc.

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Question	Answer	Marks	Partial Marks
10(a)	187	**1**	
10(b)	90	**2**	**M1** for 65 × 6 **and** 60 × 5 soi
11	Correct method to eliminate one variable reaching $ax = b$ or $cy = d$	**M1**	
	$x = 3$ $y = –0.5$ oe	**A2**	**A1** for either $x = 3$ or $y = –0.5$ oe Or after **A0**, **C1** for a pair of values that satisfy either equation or for correct answers with no working
12(a)	$y = \frac{12}{x^2}$ oe	**2**	**M1** for $3 = \frac{k}{2^2}$ soi or $\frac{3}{4} = \frac{k}{4^2}$ soi
12(b)	$[\pm]\frac{1}{2}$ oe	**1**	
13(a)	150	**1**	
13(b)	2	**2**	**M1** for $(162 – 150) = 150 \times \frac{x}{100} \times 4$ oe After 0 scored, **C1** for answer 27
14(a)	5	**2**	**M1** for $7 = \frac{3 \times 11 - k}{4}$ soi
14(b)	$\frac{4x + k}{3}$ or $\frac{4x + 5}{3}$ oe final answer	**2**	**FT** *their k* **M1** for correct first step e.g. $x = \frac{3y - k}{4}$ or $4y = 3x – k$ or better
15(a)	Reflection $y = –x$ oe	**2**	**C1** for reflection or for $y = –x$ oe
15(b)	Triangle vertices (–1, 2), (–1, 5), (–2, 4)	**2**	**C1** for correct size and orientation, incorrect position or for 90° clockwise rotation about origin
16(a)	$y = 2x + 3$ oe	**2**	**C1** for $y = 2x + c$ o.e. or $y = mx + 3$ oe $m \neq 0$ or $2x + 3$ or **M1** for gradient = 2 or intercept = 3 soi
16(b)	9	**2**	**M1** for $\frac{5 - -1}{1 - p} = -\frac{3}{4}$ oe or for $5 = -\frac{3}{4} \times 1 + c$ **and** $-1 = -\frac{3}{4} \times p + c$ seen

Question	Answer	Marks	Partial Marks
17(a)	Angles in same segment are equal	**1**	
17(b)	$\angle PQT = 55°$	**1**	
17(c)	$\angle SPQ = 70°$	**1**	
17(d)	$\angle SRQ = 110°$	**1**	**FT** 180 – *their* **(c)**
18(a)	18	**2**	**M1** for $\frac{v-12}{15}$ or $\frac{12-v}{15}$ oe
18(b)	345	**2**	**B1FT** for a correct partial area: 120 or 225 or 300 or 45 or 180 or **M1FT** for $12 \times 25 + 0.5 \times 15 \times$ (*their*18 – 12) oe
19(a)	60	**2**	**B1** for [angle sum of pentagon =] 540 or $(5 – 2) \times 180$ oe
19(b)	24 nfww	**2**	**B1** for exterior angle = 15° or interior angle = 165° soi or **M1** for $\frac{360-30}{2} = \frac{180(n-2)}{n}$ oe
20(a)(i)	2×3^3 or $2 \times 3 \times 3 \times 3$	**1**	
20(a)(ii)	4	**1**	
20(b)(i)	$\frac{3}{2}$ oe	**1**	
20(b)(ii)	6	**1**	
21(a)(i)	$\frac{1}{3}\mathbf{a} + \frac{1}{3}\mathbf{b}$ or $\frac{1}{3}(\mathbf{a} + \mathbf{b})$ or $\frac{\mathbf{a}+\mathbf{b}}{3}$ final answer	**1**	
21(a)(ii)	$\frac{1}{3}\mathbf{a} - \frac{2}{3}\mathbf{b}$ or $\frac{1}{3}(\mathbf{a} - 2\mathbf{b})$ or $\frac{\mathbf{a}-2\mathbf{b}}{3}$ final answer	**1**	
21(b)	Any two pairs of vectors from $\overrightarrow{OA} = \overrightarrow{BC}$ oe $\overrightarrow{OQ} = \overrightarrow{PC}$ oe $\overrightarrow{QA} = \overrightarrow{BP}$ oe **Alternative method:** $OA = BC$ $OQ = PC$ $\angle AOQ = \angle BCP$	**2**	**B1** for any one pair of vectors stated **B1** for two of these pairs of sides stated or one of these pairs of sides and this pair of angles stated

Question	Answer	Marks	Partial Marks
22(a)	6	**2**	**M1** for $720 = 15 \times 8 \times h$ soi
22(b)	396	**2**	**FT** *their h* **C1FT** for answer 276 or for answer 516 or **M1FT** for $8 \times 15 + 2 \times$ *their* $6 \times 8 + 2 \times 15 \times$ *their* 6
22(c)	3.6 oe	**1**	**FT** $0.6 \times$ *their* 6
23(a)	$\frac{3}{4}$ oe	**2**	**M1** for $7x = 3(4 - 3x)$ or better
23(b)	$\frac{2x+3}{x-5}$ final answer	**3**	**B1** for $(2x + 3)(2x - 3)$ seen **B1** for $(2x - 3)(x - 5)$ seen
24(a)	Correctly completed tree diagram $\frac{n-3}{n-1}$ oe $\frac{n-3}{n}$ oe $\frac{n-4}{n-1}$ oe	**2**	**C1** for one correct probability correctly positioned
24(b)	$\frac{3}{n} \times \frac{2}{n-1} = \frac{1}{15}$	**M1**	
	Correct rearrangement with at least one further step to reach $n^2 - n - 90 = 0$	**A1**	
24(c)	10	**2**	**B1** for solutions 10, –9 seen or **M1** for $(n - 10)(n + 9)$ [= 0] or for $\frac{1 \pm \sqrt{(-1)^2 - 4 \times 1 \times -90}}{2 \times 1}$ or better

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