Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

MATHEMATICS (SYLLABUS D) **4024/11**

Paper 1 **October/November 2016**

MARK SCHEME

Maximum Mark: 80

Published

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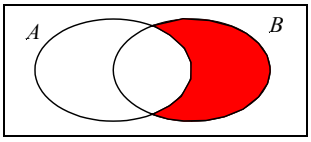
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Question	Answers	Mark	Part marks
1 (a)	$\frac{17}{30}$ h	1	
(b)	(0).0033	1	
2 (a)	7	1	
(b)	30	1	
3 (a)	$\frac{13}{40}$ cao	1	
(b)	$\frac{7}{20}$ $\frac{9}{25}$ 0.38 0.4	1	
4 (a)	4.8(0)	1	
(b)	24	1	
5 (a)	360 cao	1	
(b)	4	1	
6	15	2 *	**B1** for "k" = –150 provided y = "k"/x is used. or **M1** for $–50 \times 3 = –10y$ oe or **M1** for y = (*their k*)/(–10) when y = "k"/x is used.
7	40	2 *	**M1** for $\frac{360}{180-171}$; or $171n = 180(n – 2)$ oe
8 (a)	7	1	
(b)	$\frac{4y}{3x}$; or $\frac{4yx^{-1}}{3}$	1	
9 (a)	0.155 cao	1	
(b)	20 WWW	1 *	
10 (a)	4.5×10^8	1	
(b)	3×10^9	2 *	**C1** for $A \times 10^9$ with $1 \leqslant A < 10$; or for 3×10^{11} or **B1** for 0.3×10^{10}

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11	**(a)**	0.35 oe	1	
	(b)	$3 - 10x$ oe	2 *	**C1** for $10x - 3$ or **B1** for 10 "y" = 3 – "x"
12	**(a) (i)**	9	1	
	(ii)	89	1	
	(b)		1	
13	**(a)**	0.5 oe	1	
	(b)	$\frac{2}{3}$ oe	1 *	
	(c)	(–) 8	1	
14	**(a)**	2.7 oe	2 *	**M1** for $\frac{BC}{6} = \frac{1.8}{4}$ oe
	(b)	$\frac{4}{5}$ oe	1 *	
15	**(a)**	Rotation 90° clockwise oe, centre (3, 1)	1 1	Mark lost if a second transformation is named.
	(b)	vertices: (–2, 4), (–4, 0), (–4, 4)	2 *	**B1** for two correct vertices, or for vertices (2, 0), (4, 0), (4, 4)
16	**(a)**	$5(1 - 2t)(1 + 2t)$	2 *	**C1** for $(1 - 2t)(1 + 2t)$ or **B1** for one of $5(1 - 4t^2)$; $(5 + 10t)(1 - 2t)$; $(5 - 10t)(1 + 2t)$
	(b)	$(3y - 2x)(y + 3)$	2 *	**B1** for one of the partial factorisations $y(3y - 2x)$; $2x(y + 3)$; $3(3y - 2x)$; $3y(y + 3)$; or their negatives, seen.

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17 **(a)**	57°	1	
(b)	33°	1	
(c)	FT 180° – their (a); or 123°	1 *	
(d)	220°	1	
18	Correctly equating one pair of coefficients or expressing one variable in terms of the other. A correct method to eliminate one variable. Either $x = -4$ or $y = 2$ WWW. Both $x = -4$ and $y = 2$ WWW.	* **M1** **M1** **A1** **A1**	If [0] earned, then award **C1** for a pair of values that satisfies either equation. If only **M1** + **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.
19 **(a)**	the point P marked correctly	1	
(b)	the point Q marked correctly	1	
(c)	$-\mathbf{a} - 2\mathbf{b}$ oe	2	**C1** for $-\mathbf{a}$; or for $-2\mathbf{b}$
20 (a)	125° to 129°	1	
(b) **(i)**	correct arc	1	
(ii)	correct straight line	1	
(iii)	PD =3.4 to 3.8 cm WWW	1 dep	Dependent on correct types of loci, that intersect.
21 **(a)**	$\begin{pmatrix} 0 & -5 \\ 7 & 9 \end{pmatrix}$	2	**C1** for 2 or 3 correct elements; or for 3 or 4 elements of $\begin{pmatrix} 12 & -1 \\ -1 & 9 \end{pmatrix}$.
(b)	$\frac{1}{7}\begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$; or $\begin{pmatrix} \frac{3}{7} & \frac{1}{7} \\ -\frac{1}{7} & \frac{2}{7} \end{pmatrix}$; or any equivalent seen	2 *	**C1** for $\frac{1}{7}\begin{pmatrix} . & . \\ . & . \end{pmatrix}$; or for $k\begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$, $k \neq \frac{1}{7}$
(c)	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$	1	

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22	**(a)**	10.4 or any equivalent	2 *	**M1** for $\frac{v-4}{8}=\frac{8}{10}$ oe or **B1** for 6.4 oe; or for 1.6 oe; seen
	(b)	80	2 *	**C1** for 140 or **M1** for 10 × (4 + 12)/2 oe
	(c)	Curve, concave upwards, from (0, 0) to (10, their(b)	1 √	independent
		Straight line from (10, their(b)) to (15, 60 + their(b))	1 √	independent
23	**(a)**	7, 21	1	
	(b)	$2n - 1$ oe	1	
	(c)	FT 3 × *their* (b) provided this is a function of n; or $6n - 3$ oe	1 √	
	(d) (i)	48	1	
	(ii)	$3n^2$	2 *	**M1** for a sensible method, e.g. writing terms as 3×1, 3×4, 3×9, ... or **B1** for $An^2 + Bn + C$, $A \neq 0$ from a valid method.
24	**(a)**	(9, 2)	1	
	(b)	$x < 9$ oe	1	In (b), if [0] scored for $x < 9$ and $y > 2$ then **C1** for both {x ... 9 or x ... their(9)}
		$y > 2$ oe	1	*and* {y ... 2 or y ... their(2)}
		$x - y > 3$ oe	1	
	(c)	$a = 8$	1	In (c), if [0] scored then
		$b = 4$	1	**C1** for $a = 4$ and $b = 8$; or for $a = 6$ and $b = 3$.

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