CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge Ordinary Level

MARK SCHEME for the October/November 2014 series

4024 MATHEMATICS (SYLLABUS D)

4024/12 Paper 1, maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

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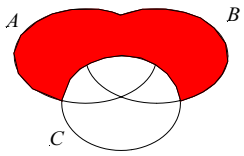
Abbreviations

cao	correct answer only
cso	correct solution only
dep	dependent
ft	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
www	without wrong working
soi	seen or implied

Question	Answers	Mark	Part marks
1 (a)	5.11 oe	1	
(b)	2 hours and 35 minutes	1	
2 (a)	59	1	
(b)	$T = \frac{13M}{500} + 20$ oe seen	1	
3 (a)	–0.5	1	
(b)	0.1	1	
4 (a)	–5	1	
(b)	$\frac{x+6}{2}$ oe	1	
5 (a)	1200 cao	1	
(b)	3	1	
6 (a)	Correct region shaded	1	
(b)	3	1	
7	25	2	**C1** for figs. 25 or **M1** for $\frac{figs\ 9}{60 \times 60}$ oe
8 (a)	1 : 2 oe	1	
(b)	1 : 8 oe, or ft *their*(a) cubed	1√	

9	**(a)**	54.25	**1**	
	(b)	$\frac{d+0.5}{54.25}$, or ft $\frac{d+0.5}{their(a)}$, seen	**1**√	
10		12	**2**	**B1** for "k" = 72 or **M1** for $9 \times 8 = 6y$ oe or **M1** for y = (*their k*)/6 when y = "k"/x used
11	**(a)**	1	**1**	
	(b)	41 40 81 (all three)	**1**	
	(c)	$(2n+1)^2$ oe	**1**	
12	**(a)**	5.67×10^{-4}	**1**	
	(b)	$6 \times 10 -12$	**2**	**C1** for figs 6, or for the index –12
13	**(a)**	140	**1**	
	(b)	1.2	**2**	**M1** for $3 \times \left(\frac{7}{5} - 1\right)$; or $3 \times \left(\frac{their(a)}{100} - 1\right)$; oe or a complete algebraic method.
14	**(a)**	10	**1**	
	(b)	216	**2**	**M1** for $\pi \times 6 \times 10 = \frac{x}{360} \times \pi r^2$ or $2 \times \pi \times 6 = \frac{x}{360} \times 2\pi r$ where r = 10 or *their*(a). Where radians are used, method must include multiplication by $\frac{180}{\pi}$.
15	**(a)**	720	**1**	
	(b)	20	**2**	**M1** for ($\pi \times 62 \times d$) (oe) = $k\pi$ where k = 720 or *their*(a)

16	**(a)**	$\begin{pmatrix}-4\\-3\end{pmatrix}$	**1**	
	(b)	$\begin{pmatrix}-3\\-4\end{pmatrix}$	**1**	
	(c)	5 cao	**1**	
17	**(a)**	$p^5 - 3$	**2**	**B1** for p^5 , or for – 3.
	(b)	$3x^2$	**2**	**C1** for 3; **C1** for x^2
18	**(a)**	$4a(1 - 4a)$	**1**	
	(b)	$(3b - c)(3b + c)$	**1**	
	(c)	$(x + 5)(x - y)$	**2**	**B1** for one of the partial factorisations $x(x - y)$; $5(x - y)$; $x(x + 5)$; $y(x + 5)$, or their negatives.
19	**(a)**	4	**1**	
	(b)	90°	**1**	
		two 150° } correctly obtained	**1**	
		two 135° } correctly obtained	**1**	If [0] earned for the two 150s, award **M1** for using 360° correctly in a quadrilateral, or for using 540° correctly in a pentagon, or for using 720° correctly in a hexagon, to find the 135. If [0] earned in (b), then **B1** for (angle sum of a hexagon equals) 720° seen.

20	**(a)**	68	**1**	
	(b)	44	**1**	
	(c)	112 or ft 180 – *their*(a)	**1**√	
	(d)	44 or ft *their*(b)	**1**√	
21	**(a)**	Correct completion of tree diagram	**1**	
	(b)	**(i)** $\frac{1}{10}$	**1**	
		(ii) $\frac{17}{50}$ or ft from *their* tree diagram	**2**√	**M1** for $\left\{\frac{2}{5}\times\frac{1}{4}\text{ or }their(bi)\right\}+\frac{3}{5}\times their\left(\frac{2}{5}\right)$
22	**(a)**	1.2	**1**	
	(b)	3.6	**1**	
	(c)	480	**2**	**M1** for $\frac{1}{2}\times(20+60)\times 12$ oe or **B1** for 180, or 240, or 60, or 420, or 300, as a correct evaluation of an identifiable appropriate area.
23	**(a)**	(8, 10)	**1**	
	(b)	$x > 8$ oe $2y > 12 + x$ oe	**1** **1**	If 0 scored, then **C1** for $x \geqslant 8$ oe **and** $2y \geqslant 12 + x$ oe.
	(c)	(9, 11)	**1**	
24	**(a)**	137° to 140° inclusive	**1**	
	(b)	**(i)** perp. bisector of AB	**1**	
		(ii) circle, centre C, radius 4 cm	**1**	
		(iii) correct region (bottom part) shaded	**1**	

25	**(a)**	$\left(-\frac{1}{2}, 1\right)$	**1**	
	(b)	$-\frac{6}{7}$	**1**	
	(c)	**(i)** (10, –8)	**2**	**C1** for one correct coordinate
		(ii) $\frac{1}{3}$	**1**	
26	**(a)**	$\frac{1}{7}$	**1**	
	(b)	$\begin{pmatrix} -1 & -4 \\ 2 & 0 \end{pmatrix}$	**2**	**C1** for 2 or 3 correct elements.
	(c)	(2 0), or (14 × *their* (a) 0) ft	**2**√	M1 for (**Y** =) (6 2) $\mathbf{A}^{-1}$ seen. If (x y) **A** = (6 2) is used, then award **M1** at the stage where an attempt to solve the simultaneous eqns. is made.