

**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

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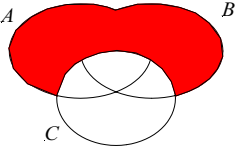
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### Abbreviations

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
<b>1 (a)</b>	5.11 oe	<b>1</b>	
<b>(b)</b>	2 hours and 35 minutes	<b>1</b>	
<b>2 (a)</b>	59	<b>1</b>	
<b>(b)</b>	$T = \frac{13M}{500} + 20$ oe seen	<b>1</b>	
<b>3 (a)</b>	-0.5	<b>1</b>	
<b>(b)</b>	0.1	<b>1</b>	
<b>4 (a)</b>	-5	<b>1</b>	
<b>(b)</b>	$\frac{x+6}{2}$ oe	<b>1</b>	
<b>5 (a)</b>	1200 cao	<b>1</b>	
<b>(b)</b>	3	<b>1</b>	
<b>6 (a)</b>	Correct region shaded	<b>1</b>	
<b>(b)</b>	3	<b>1</b>	
<b>7</b>	25	<b>2</b>	<b>C1</b> for figs. 25 or <b>M1</b> for $\frac{\text{figs } 9}{60 \times 60}$ oe
<b>8 (a)</b>	1 : 2 oe	<b>1</b>	
<b>(b)</b>	1 : 8 oe, or ft <i>their(a)</i> cubed	<b>1</b> <sup>1/2</sup>	

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9	(a) 54.25	1	
	(b) $\frac{d+0.5}{54.25}$ , or ft $\frac{d+0.5}{their(a)}$ , seen	1 <sup>1/2</sup>	
10	12	2	<b>B1</b> for “k” = 72 or <b>M1</b> for $9 \times 8 = 6y$ oe or <b>M1</b> 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) $5.67 \times 10^{-4}$	1	
	(b) $6 \times 10^{-12}$	2	<b>C1</b> for figs 6, or for the index –12
13	(a) 140	1	
	(b) 1.2	2	<b>M1</b> 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	<b>M1</b> 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 <i>their(a)</i> . Where radians are used, method must include multiplication by $\frac{180}{\pi}$ .
15	(a) 720	1	
	(b) 20	2	<b>M1</b> for $(\pi \times 62 \times d)$ (oe) = $k\pi$ where $k = 720$ or <i>their(a)</i>

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

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20	(a)	68	1	
	(b)	44	1	
	(c)	112 or ft 180 – <i>their</i> (a)	1 <sup>✓</sup>	
	(d)	44 or ft <i>their</i> (b)	1 <sup>✓</sup>	
21	(a)	Correct completion of tree diagram	1	
	(b)	(i) $\frac{1}{10}$ (ii) $\frac{17}{50}$ or ft from <i>their</i> tree diagram	1 2 <sup>✓</sup>	<b>M1</b> for $\left\{\frac{2}{5} \times \frac{1}{4} \text{ or } \textit{their}(bi)\right\} + \frac{3}{5} \times \textit{their}\left(\frac{2}{5}\right)$
22	(a)	1.2	1	
	(b)	3.6	1	
	(c)	480	2	<b>M1</b> for $\frac{1}{2} \times (20 + 60) \times 12$ oe  or <b>B1</b> 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 <b>C1</b> for $x \geq 8$ oe <b>and</b> $2y \geq 12 + x$ 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	

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