CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2013 series

4024 MATHEMATICS (SYLLABUS D)

4021/11 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.

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Question		Answers	Mark	Part marks
1	(a)	$\frac{15}{16}$ oe	1	
	(b)	9 cao	1	
2	(a)	0.024	1	
	(b)	0.2 22% $\frac{2}{9}$	1	
3	(a)	2 : 9	1	
	(b)	4.8 (0) oe in dollars and/or cents	1	
4		Two numbers between 2 and $2\frac{1}{3}$	2	**C1** for one correct number. or **B1** for $3x < 7$, or for $x < \frac{7}{3}$, or for $x < 2\frac{1}{3}$ or $\frac{3x}{3} < \frac{7}{3}$
5	(a)	$4d + 20$ oe	1	
	(b)	$(d-5)^2$ oe	1	
6	(a)	135	1	
	(b)	1.2×10^6	1	
7		20	2	Dep. on **three** correct approximations **seen**. **B1** for $\sqrt{8.8536} \approx 3$ **or** ((38.982 ≈ 39 or 40) and 6.0122 ≈ 6 or 6.0)
8	(a)	$\frac{4}{9}$ cao	1	
	(b)	$\frac{4}{81}$ cao	1	
9	(a)	20	1	
	(b)	10	2	**M1** for $60 \times \frac{20}{120}$ oe

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10	**(a)**	210°	1	
	(b)	330°	1	
	(c)	43	1	
11	**(a)**	3.75, or $3\frac{3}{4}$, only	1	
	(b)	320	2	**C1** for figs 32 or **M1** for $5 \times 40 \times 40 \times 40$ or 5×40^3
12	**(a)**	All of 4, 5, 6, 6, 4	2	**C1** for 3 or 4 correct values
	(b)	$\frac{18}{43}$ cao	1	
13	**(a)**	$-\frac{5}{8}$, or –0.625, only	1	
	(b)	$\frac{7}{2x+3}$ oe	2	**B1** for $2x$ "y" + $3x = 7$ oe (condone swaps of x and "y") – both variables on the same side.
14	**(a)**	$(A \cup B) \cap C$	1	
	(b)	**(i)** 6	1	
		(ii) d, e, f	1	
15	**(a)**	0, or none	1	
	(b)	40	1	
	(c)	147	1	
16	**(a)**	**(i)** 5	1	
		(ii) 3	1	
	(b)	13	1	
17	**(a)**	$y > 4$ oe $y < 4x$ oe	1 1	If 0 scored, then **B1** for y ... $4x$, oe, **and** y ... 4, oe, with incorrect inequalities for ... .
	(b)	3	1	

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18		76 WWW	3	**M2** for a completely correct method to find an equation for x. or **M1** for $66 + 70 + 120 + 90 + 90 + y = 180k$ where $k > 2$, $k \neq 4$ **and** $x = 360 - y$. or **B2** for 284 WWW for the missing **interior** angle. or **B1** for $(6 - 2) \times 180$ or 720 (if as angle sum of the hexagon) used.
19		$8\pi x^3$	3	**C2** for a correct, unsimplified answer. or **B1** for $\frac{1}{3}\pi \times (2x)^2 \times 7x$, or for $\frac{28}{3}\pi x^3$ seen and **B1** for, $\frac{1}{3}\pi \times x^2 \times 4x$, or for $\frac{4}{3}\pi x^3$ seen
20	**(a)**	$\frac{6}{35}$	1	
	(b)	0	1	
	(c)	$\frac{17}{35}$	2	**C1** for $\frac{8}{35}$, or for $\frac{13}{35}$ or **B1** for $\frac{17}{their(5 \times 7)}$
21	**(a)**	**(i)** $4\mathbf{q} - 2\mathbf{p}$, or $-2\mathbf{p} + 4\mathbf{q}$, only	1	In **(a)**, award **C1** if **both** answers are correct, but not in their simplest form.
		(ii) $5\mathbf{q}$ ft *their* **(i)** + $2\mathbf{p} + \mathbf{q}$, simplified	1√	
	(b)	$k\mathbf{p}$ + *their* **(ii)**	1√	
	(c)	10	1	
22	**(a)**	54°	1	
	(b)	36°	1	
	(c)	61°	1	
	(d)	25°	1	

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23	**(a)**	(–) $\frac{1}{5}$, or (–) 0.2, only	1	
	(b)	4	1	
	(c)	11	2	**C1** for 5. or **M1** for trap. = $\frac{1}{2}\times10\times(6+u)=85$ oe or **M1** for $\frac{1}{2}\times10\times(u-6)=85-6\times10$ oe
24	**(a)**	$A + B = 5$ correctly obtained from $15 = 10 + A + B$	1	
		$4A + B = 2$ correctly obtained from $11=10+2A+\frac{B}{2}$	1	
	(b)	both $A = –1$ and $B = 6$	2	**C1** if one correct
	(c)	9 cao	1	
25	**(a)**	Reflection $x = –1$ oe indep	1 1	indep. – but lost if more than one transf. named.
	(b)	Triangle with vertices (0, 6), (–1, 5), (–2, 5)	2	**C1** for 2 correct vertices, or for a triangle with vertices (0, 2), (1, 3), (2, 3).
	(c)	4	1	
26	**(a)**	$\begin{pmatrix}1 & 3\\0 & -2\end{pmatrix}$	2	**C1** for 2 or 3 correct elements
	(b)	$\begin{pmatrix}1 & -18\\6 & 13\end{pmatrix}$	2	**C1** for 2 or 3 correct elements
	(c)	$\begin{pmatrix}3 & 0\\0 & 3\end{pmatrix}$ oe	1	

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