

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.

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

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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 \approx 39 or 40) and 6.0122 \approx 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 $y \dots 4x$, oe, and $y \dots 4$, oe, with incorrect inequalities for ...
	(b)	3	1	

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

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