

MARK SCHEME for the May/June 2014 series

0444 MATHEMATICS (US)

0444/21

Paper 2, maximum raw mark 70

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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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

Qu.	Answers	Mark	Part Marks
1	$1\frac{1}{4}$ oe	2	B1 for $\frac{3}{4}$ oe or $\frac{1}{2}$ oe
2	[0].06 oe	2	B1 for [0].05 oe or [0].01 oe
3	30	2	M1 for $n - 8 = 22$ or $\frac{n}{2} = 15$
4 (a)	$\frac{5 \times 2}{20}$	1	
(b)	0.5 or $\frac{1}{2}$ cao	1	
5 (a)	18	1	
(b)	$5\sqrt{6}$	2	B1 for $2\sqrt{6}$ or $3\sqrt{6}$
6	20	3	M1 for 80×1.5 And M1 for $(their\ 120 - 88) \div 1.6$
7	$4 \pm \sqrt{y - 6}$	3	M1 for <i>their</i> 6 moved correctly M1 for <i>their</i> $\sqrt{\quad}$ taken correctly M1 for <i>their</i> 4 moved correctly
8	$\frac{2}{x(x+1)}$	3	B1 for common denominator $x(x+1)$ seen. M1 for $2(x+1) - 2x$ oe or better
9 (a)	119	3	M2 for $18 \times 6 + 11$ oe or B1 for 18 or 11 or 108
(b)	[0] 1 [00] pm cao	1	

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10	(a)	$(a + b)(x + y)$	2	B1 for $a(x + y) + b(x + y)$ or $x(a + b) + y(a + b)$
	(b)	$(x - 1)(3x - 2)$	2	B1 for $(x - 1)(3(x - 1) + 1)$ If B0 then SC1 for $(x + a)(3x + b)$ where $3a + b = -5$ or $ab = 2$ or $3(x - 1)(x - \frac{2}{3})$
11		$\frac{5}{24}$ oe	3	M2 for $\frac{1}{4} \times \frac{2}{6} + \frac{3}{4} \times \frac{1}{6}$ or better or M1 for one of these products
12	(a)	2×10^{10}	2	B1 for 20×10^9 or 20 000 000 000
	(b)	1.25×10^{-1}	2	B1 for 0.125 oe
13	(a)	32	2	B1 for $AOC = 116$
	(b)	35	2	B1 for $CDA = 122$
14		$y = \frac{2}{3}x - 2$ oe	4	B1 for (9, 4) and M2 for $y = kx - 2$ ($k \neq 0$) or $y = \frac{2}{3}x + k$ ($k \neq 0$) or $\frac{2}{3}x - 2$ or M1 for $y = \frac{2}{3}x$ or $\frac{2}{3}x + k$ ($k \neq 0$)
15		[0], 1, 2, 3	4	M1 for moving the 5 correctly M1 for collecting <i>their</i> terms A1 for a correct inequality for x eg $[0 \leq] x < 4$
16	(a)	8	2	B1 for 2^{12} or 4096
	(b)	$2q^{\frac{3}{2}}$	3	B2 for $kq^{\frac{3}{2}}$ as the answer or B1 for $2q^2$ and B1 for $q^{\frac{1}{2}}$ oe nfw
17	(a)	correct working	2	M1 for 1 holiday = 5 or $360 \div 72 = 5$ and B1 for $24 \times 5 [= 120]$ or M2 for $\frac{24}{72} \times 360 [= 120]$ oe
	(b)	6	3	M1 for $150 + 120 + x + 2x = 360$ oe A1 for 30 identified as the required angle

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<p>18 (a)</p> <p>(b)</p>	<p>correct working</p> <p>56</p>	<p>2</p> <p>4</p>	<p>B2 for $\sqrt[3]{\frac{1}{8}} = \frac{1}{2}$ or $\sqrt[3]{8} = 2$ AND $\frac{10}{2} = 5$ oe and</p> <p>oe</p> <p>or</p> <p>B1 for $\sqrt[3]{\frac{1}{8}}$ or $\sqrt[3]{8}$ or $8 = 2^3$ or $\frac{1}{8} = (\frac{1}{2})^3$</p> <p>M3 for $\frac{7}{8} \times \frac{1}{3} \times \pi \times 4^2 \times 12$ oe</p> <p>or</p> <p>M1 for $\frac{1}{3} \times \pi \times 4^2 \times 12$ oe</p> <p>M1 for $\frac{1}{3} \times \pi \times 2^2 \times 6$ oe</p> <p>M1 for subtracting <i>their</i> volumes</p>
<p>19</p>	<p>$12 - 4\sqrt{3} + \frac{4}{3}\pi$</p>	<p>7</p>	<p>B2 for $BC = 4$</p> <p>or M1 for $8 \cos 60$ oe</p> <p>or B1 for $\sin 30$ or $\cos 60 = \frac{1}{2}$ or $AE = 4$</p> <p>and</p> <p>B2 for $[DC =] 8 - 8\frac{\sqrt{3}}{2}$ oe</p> <p>or M1 for $8 - 8\sin 60$ oe</p> <p>or B1 for $\sin 60$ or $\cos 30 = \frac{\sqrt{3}}{2}$ or $[DE =] 8\sin 60$ oe</p> <p>and</p> <p>B2 for $[DB =] \frac{4}{3}\pi$</p> <p>or M1 for $\frac{30}{360} \times \pi \times 16$ oe</p>