



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

MATHEMATICS (US)

0444/21

Paper 2 (Extended)

May/June 2016

MARK SCHEME

Maximum Mark: 70

Published

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Abbreviations

cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfw	not from wrong working
soi	seen or implied

Question	Answer	Mark	Part marks
1	8(h) 52 (min)	1	
2	12	1	
3	[0].00127	1	
4	28	2	B1 for 24 or -3
5	540	2	M1 for 2000×0.27
6	144	2	M1 for finding a correct product of prime factors or correctly listing a minimum of 3 multiples of 36 and 48 or for answer $2^4 \times 3^2$ oe or $144k$
7	11	2	M1 for $-2 \times -7 - 3$ soi
8	$\frac{py}{q}$ final answer	2	M1 for 1 correct step
9	$[a =] 70$ $[b =] 40$	2	B1 for each
10	$[x =] -2$ $[y =] 7$	1 1	If 0 scored, SC1 for two values satisfying one of the original equations
11 (a)	112	1	
(b)	56	1	
12	$2p^4$ final answer	2	B1 for kp^4 or $2p^k$ as answer
13	$n > \frac{15}{4}$	2	M1 for $7 + 8 < 5n - n$ oe
14	$2\cos \frac{1}{2}x$	3	B1 for cos B1 for amplitude = 2 or $2\sin \dots$ or $2\cos \dots$ B1 for $\frac{1}{2}x$ oe

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Question	Answer	Mark	Part marks
15 (a)	-3	1	
(b)	$9 - 2n$ oe	2	B1 for $-2n + k$ or $dn + 9$ where $d \neq 0$
16	$\frac{18}{35}$ cao	3	M2 for $\frac{6}{7} \times \frac{3}{5}$ or $\frac{18}{21} \div \frac{35}{21}$ oe B1 for $\frac{5}{3}$ oe or M1 for $\frac{6}{7} \times \text{their } \frac{3}{5}$
17	145	3	M2 for $(6 - 2) \times 180 - 5 \times 115$ or M1 for $(6 - 2) \times 180$ <u>Alt method</u> M2 for $180 - (360 - 5 \times (180 - 115))$ or M1 for $360 - 5 \times (180 - 115)$
18	2 nfww	3	M2 for $(36 + 4) \div (72 \times \frac{1000}{60 \times 60})$ oe or M1 for $72 \times \frac{1000}{60 \times 60}$ or for a distance \div a speed SC2 for answer 1.8
19	2	3	M1 for $y = k\sqrt{x}$ A1 for $k = 4$ or M2 for $\frac{\sqrt{9}}{12} = \frac{\sqrt{1/4}}{y}$ oe
20	$\frac{5}{6}$	3	M2 for $1 - \frac{2}{3} \times \frac{1}{4}$ or $\frac{1}{3} + \frac{2}{3} \times \frac{3}{4}$ or $\frac{1}{3} \times \frac{3}{4} + \frac{1}{3} \times \frac{1}{4} + \frac{2}{3} \times \frac{3}{4}$ or M1 for $\frac{2}{3} \times \frac{1}{4}$ or $\frac{1}{3} \times \frac{1}{4} + \frac{2}{3} \times \frac{3}{4}$
21 (a)	$5\sqrt{5}$ final answer	1	
(b)	$-24 - 5\sqrt{5}$ final answer	2	B1 for three terms correct from $6 - 9\sqrt{5} + 4\sqrt{5} - 6 \times \sqrt{5} \times \sqrt{5}$
22	27	3	M2 for $\frac{6\pi}{\pi \times 2 \times 9} \times \pi \times 9^2$ oe or M1 for $\frac{6\pi}{\pi \times 2 \times 9}$ oe

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Question	Answer	Mark	Part marks
23	30 nfww	4	M2 for height = $\sqrt{5^2 - 4^2}$ or M1 for $4^2 + h^2 = 5^2$ oe and M1 for $\frac{1}{2}(8+12) \times \text{their perp height}$ oe
24 (a)	$(a+2)(2+p)$	2	B1 for $2(a+2) + p(a+2)$ or $a(2+p) + 2(2+p)$
(b)	$2(9+2t)(9-2t)$ oe	2	B1 for $2(81-4t^2)$ oe or $(18+4t)(9-2t)$ oe If 0 scored SC1 for $(9+2t)(9-2t)$ final answer
25	$y = -\frac{3}{7}x + 11$ oe	6	B2 for gradient = $-\frac{3}{7}$ or M1 for [gradient =] $\frac{15-1}{10-4}$ oe or for the negative reciprocal of <i>their</i> gradient and B2 for [midpoint of AB =] (7, 8) or B1 for (7, k) or (k, 8) and M1 for substitution of <i>their</i> midpoint or (4, 1) or (10, 15) into a linear equation
26 (a)	$6\sqrt{3}$	3	M2 for $\frac{1}{2} \times 8 \times 3 \times \frac{\sqrt{3}}{2}$ oe or M1 for $\frac{1}{2} \times 8 \times 3 \times \sin 60$ oe or B1 for [sin 60 =] $\frac{\sqrt{3}}{2}$
(b)	7	3	M2 for $3^2 + 8^2 - 2 \times 3 \times 8 \times \frac{1}{2}$ oe or M1 for $3^2 + 8^2 - 2 \times 3 \times 8 \times \cos 60$ oe or B1 for [cos 60 =] $\frac{1}{2}$