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

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
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	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 2sin… or 2cos… **B1** for $\frac{1}{2}x$ oe

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 $\frac{6}{7}\times$ *their* $\frac{3}{5}$
17	145	3	**M2** for $(6-2)\times 180-5\times 115$ or **M1** for $(6-2)\times 180$ Alt method **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 ÷ 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

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 $\frac{1}{2}(8+12)\times$ *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 *their* gradient **and** **B2** for [midpoint of AB =] (7, 8) or **B1** for (7, k) or (k, 8) **and M1** for substitution of *their* midpoint or (4, 1) or (10, 15) into a linear equation
26 (a)	$6\sqrt{3}$	3	**M2** for $\frac{1}{2}\times8\times3\times\frac{\sqrt{3}}{2}$ oe or **M1** for $\frac{1}{2}\times8\times3\times\sin60$ oe or **B1** for [sin 60 =] $\frac{\sqrt{3}}{2}$
(b)	7	3	**M2** for $3^2+8^2-2\times3\times8\times\frac{1}{2}$ oe or **M1** for $3^2+8^2-2\times3\times8\times\cos60$ oe or **B1** for [cos 60 =] $\frac{1}{2}$