

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
International General Certificate of Secondary Education

**MARK SCHEME for the May/June 2014 series**

<b>0444 MATHEMATICS (US)</b>	
<b>0444/21</b>	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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Page 2	Mark Scheme	Syllabus
	IGCSE – May/June 2014	0444

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

Page 3	Mark Scheme	Syllabus
	IGCSE – May/June 2014	0444

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

Page 4	Mark Scheme	Syllabus
	IGCSE – May/June 2014	0444

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