

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2014 series

0444 MATHEMATICS (US)

0444/23

Paper 2 (Extended), maximum raw mark 70

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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

	Answer	Mark	Part marks
1	28 500	2	M1 for 300×95
2	$3.6\% < 0.34 < 0.6^2 < \frac{3}{5}$	2	B1 for 0.6, 0.36, 0.036 or converting to % or for 3 values in correct relative positions
3	2.4×10^8	2	B1 for $k \times 10^8$ or 2.4×10^k or 240 000 000
4	30	2	M1 for $2x + 3x + 4x + 90 = 360$ oe
5	70	2	M1 for $56 \div 0.8$ oe
6	512	2	B1 for 8^3
7	1, 2, 5	2	SC1 for 5, 2, 1, 2, 5 or 1, 2, 5 with extras
8	$7\sqrt{5}$	2	B1 for $4\sqrt{5}$ or $3\sqrt{5}$ seen
9	60, 120	2	B1 for 60 or 120 seen
10	9.5 or $\frac{19}{2}$	3	M2 for $2x = (8 \times 3) - 5$ or better oe or M1 for $2x + 5 = 8 \times 3$ or better
11	160	3	M2 for $180 - \frac{360}{18}$ or $\frac{180 \times (18 - 2)}{18}$ or M1 for $180 \times (18 - 2)$ or $\frac{360}{18}$
12	$8 + (y - 2)^2$ oe final answer	3	M1 for $y - 2 = \sqrt{x - 8}$ M1 for squaring both sides completed correctly M1 for adding <i>their</i> 8 completed correctly on answer line
13	4	3	M2 for $6(3 + 5) = y(7 + 5)$ oe or M1 for $y = \frac{k}{x + 5}$ oe A1 for $k = 48$
14	3, 180, 0	3	B1 each

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15	13 230	3	B2 for $600 + 630$ oe seen or M2 for $12\,000 \times (1.05)^2$ oe or M1 for 5% of 12 600 attempted soi (e.g by 630)
16 (a)	3025 cao	2	M1 for $\frac{1}{4} \times 10^2 \times (10 + 1)^2$
(b)	$2n^2(n + 1)^2$ oe	1	
17	$\frac{16x^2 + 18x + 9}{6x}$ final answer	4	M2 for 9 [+] $4x^2$ [+] $18x$ [+] $12x^2$ or better or M1 for 2 of these and M1FT for adding their four ‘numerators’ together correctly and B1 for denominator $6x$ to a maximum of 3 marks
18 (a)	$\frac{1}{2}\mathbf{b} - \frac{1}{2}\mathbf{a}$ oe	2	M1 for $\frac{1}{2}(\overrightarrow{AO} + \overrightarrow{OB})$ oe or correct unsimplified route eg $\overrightarrow{AO} + \overrightarrow{OB} + \overrightarrow{BP}$ or $-\mathbf{a} + \mathbf{b} + \frac{1}{2}\overrightarrow{BA} = -\mathbf{a} + \mathbf{b} + \frac{1}{2}(\mathbf{a} - \mathbf{b})$
(b)	$\frac{1}{4}\mathbf{a} + \frac{3}{4}\mathbf{b}$ oe	2	M1 for $\overrightarrow{OA} + \overrightarrow{AQ}$ oe or correct unsimplified route
19 (a)	Reflection $y = x$	1 1	
(b)	Triangle at (3, 3) (6, 3) and (3, 5)	2	M1 for any two vertices correct or correct answer translated horizontally
20 (a)	64	2	B1 for $[f(1) =] 4$ or M1 for $((x - 3)^2)^3$ or better
(b)	$4x + 1$ oe	2	M1 for $x = \frac{y - 1}{4}$ or $4y = x - 1$
(c)	$\frac{x^3 - 1}{4}$ oe final answer	1	
(d)	3 nfw	1	
21 (a)	3.08 to 3.22 nfw	2	B1 for 502.5 to 502.62 or 505.7 to 505.8
(b)	$\frac{16}{200}$ oe	2	B1 for 16 soi or M1 for $\frac{their\,16}{200}$
(c)	18.5 26 3	2	B1 for 18.5 and 26 B1 for 3

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22	(a)	13	4	B3 for $\frac{53}{4}$ oe or M2 for $636\pi \div \left(\frac{1}{3}\pi \times 4^2 \times 9\right)$ oe or M1 for $\left(\frac{1}{3}\pi \times 4^2 \times 9\right)$
	(b)	12π		3 B2 for $0.25 \times \left(\frac{1}{3}\pi \times 4^2 \times 9\right)$ or $636\pi - (13 \times 48\pi)$ or M1 for <i>their remainder</i> $\times \left(\frac{1}{3}\pi \times 4^2 \times 9\right)$ or $636\pi - (\text{their } 13 \times 48\pi)$