CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2013 series

0444 MATHEMATICS (US)

0444/23 Paper 2 (Extended), 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.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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
art anything rounding to
soi seen or implied

	Answers	Mark	Part Marks
1	39	**2**	**M1** for $52 \times 45 \div 60$ oe
2	Any two of (20, 8) (–4, 0) (12, 24)	**2**	**B1** for one correct
3	–8	**2**	**M1** for $2x = -16$ or $\frac{1}{2} + x = -7.5$
4	64	**2**	**M1** for (their $(5 - 1)$)^3
5	[domain] 0 x 3 [range] 2	**1** **1**	
6 (a)	600 000	**1**	
(b)	90	**2**	**M1** for $\div 1000 \times 60 \times 60$
7	30	**3**	**M2** for $24 \div 0.8$ or **M1** for recognition of 80% = 24
8	5	**3**	**M2** for $(x - 5)(x - 1)$ or **M1** for evidence of a factorisation which gives the correct coefficient of x or positive prime constant term e.g. $(x - 7)(x + 1)$, $(x - 4)(x - 2)$, $(x - 3)(x - 1)$
9	1600	**3**	**M1** for $m = kx^3$ **A1** $k = 25$ or **M2** for $200 \times \left(\frac{4}{2}\right)^3$
10 (a)	$a^2 + 2ab + b^2$ final answer	**2**	**B1** for a^2 [+] ab [+] ab [+] b^2 seen
(b)	22	**1**	
11	12	**3**	**M2** for $\sqrt{15^2 - 9^2}$ or **M1** for $AB^2 + 9^2 = 15^2$ oe

12 **(a)**	[amplitude] 2 [period] 360	**1** **1**	
(b)	4 sin x	**1**	
13 **(a)**	2	**1**	
(b)	Accurate bisector of **either** side of rectangle	**2**	**B1** for correct ruled line (cross two sides) **B1** for 2 pairs of correct arcs
14 **(a)**	4.8×10^6	**2**	**B1** for 4 800 000
(b)	9.3×10^7	**2**	**B1** for 93 000 000 or 93×10^6 or 0.93×10^8 oe
15 **(a)**	24	**2**	**M1** for $MOC = 48$
(b)	24	**2**	**M1** for $ACM = 66$ or **B1** for 48 – *their* **(a)**
16 **(a)**	$8q^{-1}$ or $\frac{8}{q}$	**2**	**B1** for $8q^k$ or kq^{-1}
(b)	$\frac{1}{5}$ or 0.2	**2**	**M1** for 5^{-2}, $\frac{1}{5^2}$ or [0].04seen oe
17 **(a)**	triangle at (0, 2) (0, 4) and (– 1, 2)	**2**	**SC1** for rotation 90° clockwise about (0, 1) or any other rotation 90° anticlockwise
(b)	stretch x-axis invariant [factor] 2	**1** **1** **1**	
18	[c =] 6 [d =] 9	**4**	accept any correct method e.g. **M1** for $\frac{30}{360} \times \pi \times 6^2$ [×2] **A1** for 6π or 6 **M1** for ½ × 6^2 × sin 120 or **B1** for sin120 = $\frac{\sqrt{3}}{2}$
19 **(a)**	19 – 19.1	**1**	
(b)	3	**2**	**M1** for 47 seen
(c)	4.9 to 5.7	**2**	**B1** for [UQ] 21.7 to 22.2 and [LQ] 16.5 to 16.8
(d)	$\frac{45}{50}$ oe	**2**	**B1** for 45 seen or **SC1** for $\frac{5}{50}$ isw

20	**(a)**	75	**2**	**B1** for [g(6)=] 36
	(b)	3.5 –6.5	**3**	**M1** for $(2x + 3)^2 = 100$ **M1** for $2x + 3 = [\pm]10$ if 0 scored **SC1** for one correct value as answer
	(c)	$\frac{x-3}{2}$ oe final answer	**2**	**M1** for $x = 2y + 3$ or $y - 3 = 2x$ or $\frac{y}{2} = x + \frac{3}{2}$
	(d)	5	**1**	