CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2013 series

0580 MATHEMATICS

0580/23 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.

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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	£ or pound[s] **Correct working must be shown**	2	**M1** for 425 ÷ 1.14 or 365 × 1.14
2	$\frac{30}{300}$ oe www	2	**M1** for 30 seen or $\frac{k}{300}$ seen
3	1500 or 3 pm	2	**B1** for 1h50 or 2h[0]5 or **SC1** for 1255 + *their* 1h50 + 15mins correctly evaluated
4 (a)	[±] **2.28** or 2.282 to 2.2822	1	
(b)	**0.109** or 0.1094[3…]	1	
5	$\left(\frac{2}{3}\right)^{1.5}$ $\left(-\frac{2}{3}\right)^{\frac{2}{3}}$ $(1.5)^{\frac{2}{3}}$ $\left(\frac{2}{3}\right)^{-1.5}$	2	**M1** for at least 2 correct decimals seen 1.3[1..] 0.5[4..] 1.8[3..] or 1.84 0.7[6..]
6	6	3	**M2** for $3\times\sqrt[3]{\frac{288\pi}{36\pi}}$ or **M1** for $3\times\sqrt[3]{\frac{288\pi}{36\pi}}$ or $3\times\sqrt[3]{\frac{36\pi}{288\pi}}$
7	260	3	**M2** for [2 ×](4 × 10 + 18 × 5) oe or **M1** for a correct area statement
8	2500	3	**M1** for $m = kr^3$ **A1** for $k = 20$
9 (a)	1.1×10^5	2	**B1** for 110 000 oe e.g.11×10^4
(b)	5×10^3	2	**B1** for 5000 oe e.g. 0.5×10^4

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10		25	**4**	**M1** for correct method to eliminate one variable **A1** for $x = 11$ **A1** for $y = 3$ **B1 FT** for 2 × *their x* + *their y* correctly evaluated
11	**(a)**	77	**2**	**M1** for 11,13,17,19 clearly identified, ignore numbers less than 8 with no other numbers greater than or equal to 8 besides possibly an extra 17
	(b)	either 18 or 19 or both	**2FT**	**M1** for 11,13,17 clearly identified, ignore numbers less than 8 with no other numbers greater than or equal to 8 besides possibly an extra 17 or for *their* (a) − 58
12	**(a)**	$\frac{5}{25}$ oe	**2**	**B1** for answer $\frac{5}{k}$ or $\frac{k}{25}$
	(b)	$\frac{4}{25}$ oe	**2**	**B1** for answer $\frac{4}{k}$ or $\frac{k}{25}$
13		$\frac{8x}{(x-3)(x+1)}$	**4**	**B1** for common denominator $(x – 3)(x + 1)$ seen **B1** for $(x + 3)(x + 1) – (x – 1)(x – 3)$ soi **B1** for $x^2 + 3x + x + 3$ or $x^2 – 3x – x + 3$ soi
14	**(a)**	$n < 9$	**2**	**M1** for $2n < 18$ or $2n – 18 < 0$ oe If 0 scored **SC1** for 9 with incorrect inequality.
	(b)	$(b + d)(a + c)$	**2**	**B1** for $b(a + c) + d(a + c)$ or $a(b + d) + c\,(b + d)$
15	**(a)**	4	**2**	**M1** for attempt at sum of all numeric and x terms equated to 74
	(b)	26	**1FT**	=18 + 2 × their (a)
	(c)	8	**1**	
16	**(a)**	1.5	**2**	**B1** for [g(18) =] 4
	(b)	$2(x + 5)$ or $2x + 10$	**2**	**M1** for correct first step e.g. $x = \frac{y}{5} – 5$ or $\frac{x}{2} = y + 5$ or $2y = x – 10$

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17	**(a)**	$\begin{pmatrix} 7 & 23 & 16 \\ 12 & 45 & 27 \end{pmatrix}$	**2**	**B1** for any one row or column correct, must be in a 2 by 3 matrix
	(b)	$\frac{1}{3}\begin{pmatrix} 6 & -3 \\ -3 & 2 \end{pmatrix}$	**2**	**B1** for $k\begin{pmatrix} 6 & -3 \\ -3 & 2 \end{pmatrix}$ or $\frac{1}{3}\begin{pmatrix} a & b \\ c & d \end{pmatrix}$
18		**15.4** or 15.35 to 15.36	**4**	**M1** for $\frac{120}{360}\times\pi\times5^2$ oe **M1** for $\frac{1}{2}\times5^2\times\sin120$ oe **M1** for $\frac{120}{360}\times\pi\times5^2-\frac{1}{2}\times5^2\times\sin120$ oe
19	**(a)**	hexagon	**1**	
	(b) (i)	$-\mathbf{b}+\mathbf{c}$	**1**	
	(ii)	$\mathbf{b}-\frac{1}{2}\mathbf{c}$	**2**	**B1** for **OB** + **BA** or any correct route
	(iii)	$-\mathbf{b}+\mathbf{c}$	**1FT**	= *their* (b)(i)
20	**(a)**	[±] 3.1623 cao	**2**	**M1** for √10 seen
	(b)	$\frac{4}{y^2-8}$ oe final answer	**4**	**M1** first move completed correctly **M1** second move completed correctly **M1** third move completed correctly **M1** final move completed correctly on answer line

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