CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2012 series

0580 MATHEMATICS

0580/22 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

Qu.	Answers	Mark	Part Marks
1	**(a)** 8000 cao	1	
	(b) 0.08 cao	1	
2	1.4 cao	2	**M1** 1.44(…) or 1.45
3	118.75 or $118\frac{3}{4}$ cao	2	**M1** $3(20)^2 + 8(20)(–5) + 3(–5)^2$ or better
4	60	2	**M1** $360 \div 6$
5	96	2	**M1** 72 / 0.75 oe or **M1** $0.75x = 72$ oe
6	**(a)** 4	1	
	(b) 2	1	
	(c) 1 cao	1	
7	2.119×10^8 cao	3	**M1** 81500 oe **M1** their LB × 2600
8	113000 or 112795 to 112840	3	**B1** for 85000 **M1** for $\pi \times 0.65^2 \times$ figs 85
9	**(a)** 5 30 pm	1	
	(b) 67	2	**M1** for 10h45min and 3h 15min oe seen
10	3.4 or $3\frac{2}{5}$	3	**M1** $22 – 6x$ **M1** $4x + 6x = 22 + 12$
11	11, 13, 17, 19, 23	3	**B2** 3 or 4 correct or **B1** 2 correct If **B0** then **M1** for $x > 10.5$ and **M1** for $x < 26.5$ or **M1** for 10.5 and 26.5 seen
12	12 by 30 by 42	3	**B1** for $10 \times 25 \times 35$ or 8750 **M1** $\sqrt[3]{\frac{15120}{8750}}$ (= 1.2)

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13	686	**3**	**M1** $m = k\,L^3$ **A1** $k = 2$
14	**(a)** $p = \frac{3}{8}$ $q = \frac{1}{2}$ **(b)** k = 6	**2** **2**	**B2** $p = \frac{9}{64}$ **and** $q = \frac{1}{4}$ or **B1** $p = \frac{3}{8}$ $q \neq \frac{1}{2}$ **M1** for a correct statement for k e.g. $\frac{5^{-3}+5^{-4}}{5^{-4}}$ or for the factorisation $5^{-4}(5 + 1) = k \times 5^{-4}$ or $\frac{1}{625}(5 + 1) = \frac{k}{625}$
15	**(a)** 3 **(b)** 637.5	**1** **3**	 **M1** finding area under graph **M1dep** all correct area statements
16	**(a)** Points plotted correctly **(b)** Positive **(c)** Line of best fit ruled	**2** **1** **1**	**B1** 6 or 7 points correct
17	**(a)** Shear x axis invariant sf 3 **(b)** $\begin{pmatrix}1 & 0\\0 & -1\end{pmatrix}$	**3** **2**	**B1** shear **B1** x axis invariant oe **B1** 3 **M1** $\begin{pmatrix}1 & 0\\0 & k\end{pmatrix}$ k ≠ 0 or k ≠ 1
18	trapezium at (–2, –1),(–4, –1), (–4, –2), (–3, –2) **www**	**5**	**SC4** for correct co-ordinates or vectors or matrix seen with no diagram or with an incorrect diagram. **SC3** for correct diagram with wrong working or one other incorrect trapezium which is not part of a correct method. If 0 then **B2** for $\begin{pmatrix}-1 & 0\\0 & -1\end{pmatrix}$ or **M1ft** "BA" $\begin{pmatrix}2 & 4 & 4 & 3\\1 & 1 & 2 & 2\end{pmatrix} = \begin{pmatrix}-2 & -4 & -4 & -3\\-1 & -1 & -2 & -2\end{pmatrix}$ **A1ft**
19	**(a)** 5 **(b)** $3x^2 + 1$ **(c)** $3x - 2$	**2** **3** **2**	**M1** f(2) = seen **M1** $9x^2 + 1$ **M1** ("$9x^2 + 1$" + 2)/3 seen **M1** for $3y = x + 2$ or $x = \frac{y+2}{3}$
20	**(a)** 10 **(b)** $y = –4x + 5$ oe **(c)** $y = –4x + 24$ oe	**2** **2** **3**	**M1** $x = –4$ and $x = 6$ seen **B1** $y = mx + 5$ ($m \neq 0$) or $y = –4x + k$ ($k \neq 0$) or $y = –4x + 5$ **M1** $m = –4$ or gradient = –4 or y = $–4x + c$ **M1** (5, 4) substituted into $y = mx + c$

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