CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2012 series

0580 MATHEMATICS

0580/21 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 2012 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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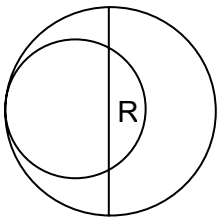
Abbreviations

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	–16	2	**M1** for 4 × 6.5
2	[0].852 or $\frac{23}{27}$	2	**B1** for 85.56 **or** $\frac{2139}{25}$
3	**(a)** 3 **(b)** 4	1 1	
4	$\frac{\frac{17}{9}}{\frac{5}{2}}$ **or** $\frac{17}{9} \div \frac{5}{2}$ $\frac{17}{9} \times \frac{2}{5} = \frac{34}{45}$	M1 M1	$\frac{\frac{34}{18}}{\frac{45}{18}}$ **or** $\frac{34}{18} \div \frac{45}{18}$ $\frac{34}{18} \times \frac{18}{45} = \frac{34}{45}$
5	$a^{(1)} - b^{(1)}$ **www** cao	2	**M1** for $a^{½}a^{½} - a^{½}b^{½} + a^{½}b^{½} - b^{½}b^{½}$ oe
6	144	2	**M1** for $ABC = 72$ or AOC reflex = 216 Angles must be fully stated or marked in correct place on diagram
7	16	2	**M1** for 768 ÷ 48
8	543.19	3	**M2** for 500×1.028^3 oe or long method or **M1** for 500×1.028^n, $n = 2$ or 4
9	$x \leqslant 39$ **www**	3	**M1** correct first move **M1** correct 2nd move **M1** correct move to answer line
10	70	3	**B1** 24.5 or 0.35 **seen** **M1** their LB ÷ their UB
11	2.5	3	**M1** $R = k/d^2$ **A1** $k = 40$ or **M1** $Rd^2 = k$ **A1** $k = 40$
12	112 or 112.3 to 112.33	3	**M2** for $\pi \times 6^2 - \pi \times 0.5^2$ or **M1** for $\pi \times 6^2$ or $\pi \times 0.5^2$ seen

13	$\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$ cao	**3**	**M2** for $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$ $\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$ or **B1** for one matrix seen	
14	114.6 or 114.57(67027..) to 114.59(1155..)	**3**	**M2** $2 \times \pi \times 4 \times x/360 = 8$ **or M1** $2 \times \pi \times 4 \times x/360$	**M2** $x/360 = 8/2\pi4$ or **B1** $8/2\pi4$ or $2\pi4/8$ seen
15	180 **www**	**3**	**M1** ½ × 60 × 14 oe **M1** their 420 – 4 × 60	
16	$\dfrac{4y+2}{y-1}$ oe	**4**	**M1** $xy - 4y = x + 2$ **M1** collecting terms in x on one side **M1** factorising **M1** dividing by coeff of x	
17	**(a)**  **(b)**	**2** **1** **1**	**B1** for correct line, on each side of AB (longer than dash at C) **B1** for 2 pairs of intersecting arcs Intention to draw a full correct circle R shaded must be a closed region	
18	**(a)** $\dfrac{7}{25}$ or $\dfrac{84}{300}$ oe **(b) (i)** 62 **(ii)** 52 **(iii)** 19 to 20 **(iv)** 125	**1** **1** **1** **1** **2**	 **B1** for 175 seen	
19	**(a)** $\begin{pmatrix} 17 & -32 \\ 16 & 1 \end{pmatrix}$ **(b)** $\begin{pmatrix} 10 & -8 \\ 4 & 6 \end{pmatrix}$ **(c)** 23 cao **(d)** $\dfrac{1}{23}\begin{pmatrix} 3 & 4 \\ -2 & 5 \end{pmatrix}$	**2** **1** **1** **2**	**M1** any 2 entries correct **M1** $\begin{pmatrix} 3 & 4 \\ -2 & 5 \end{pmatrix}$ or $\dfrac{1}{\textbf{(c)}}\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ seen	

20	**(a)** 12	**1**	
	(b) $2x^3$ cao	**2**	**M1** clear evidence of adding 1 then multiplying by 4 to g(x)
	(c) $\sqrt[3]{2(x+1)}$ oe	**3**	**M1** each correct move
21	**(a)** triangle at (1, 1), (1, –1), (2, –1)	**2**	**SC1** triangle at (–1, –1),(–1, 1), (–2, 1)
	(b) triangle at (–1, –1)(1, –1), (1, –2)	**2ft**	correct or reflection of their triangle in $y = -x$
	(c) reflection in the x axis	**2**	**B1** reflection **B1** x axis or $y = 0$
		70	