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.

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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	1	
	(b) 4	1	
4	$\frac{\frac{17}{9}}{\frac{5}{2}} \text{ or } \frac{17}{9} \div \frac{5}{2}$	M1	$\frac{\frac{34}{18}}{\frac{45}{18}} \text{ or } \frac{34}{18} \div \frac{45}{18}$
	$\frac{17}{9} \times \frac{2}{5} = \frac{34}{45}$	M1	$\frac{34}{18} \times \frac{18}{45} = \frac{34}{45}$
5	$a^{(1)} - b^{(1)}$ www cao	2	M1 for $a^{1/2}a^{1/2} - a^{1/2}b^{1/2} + a^{1/2}b^{1/2} - b^{1/2}b^{1/2}$ 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	$x \le 39$ 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

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13	$\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} cao$	3	M2 for $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ $\begin{bmatrix} 1 \\ 0 & -1 \\ 0 & 0 \end{bmatrix}$ or B1 for one matrix see	
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 $\frac{1}{2} \times 60 \times 14$ oe M1 their $420 - 4 \times 60$	
16	$\frac{4y+2}{y-1} \text{ oe }$	4	M1 $xy - 4y = x + 2$ M1 collecting terms in M1 factorising M1 dividing by coeff of	
17	(a) R	2	B1 for correct line, on (longer than dash at <i>C</i>) B1 for 2 pairs of interse	ecting arcs
		1	Intention to draw a full	
	(b)	1	R shaded must be a clo	sed region
18	(a) $\frac{7}{25}$ or $\frac{84}{300}$ oe	1		
	(b) (i) 62	1		
	(ii) 52	1		
	(iii) 19 to 20	1		
	(iv) 125	2	B1 for 175 seen	
19	(a) $\begin{pmatrix} 17 & -32 \\ 16 & 1 \end{pmatrix}$	2	M1 any 2 entries corre	ct
		1		
	(c) 23 cao	1		
	$ \begin{pmatrix} \mathbf{d} \end{pmatrix} \frac{1}{23} \begin{pmatrix} 3 & 4 \\ -2 & 5 \end{pmatrix} $	2	$\mathbf{M1} \begin{pmatrix} 3 & 4 \\ -2 & 5 \end{pmatrix} \text{ or } \frac{1}{\mathbf{(c)}} \begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$	$\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ seen

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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
	(c) reflection in the x axis	2	y = -x B1 reflection B1 x axis or $y = 0$
		70	