## **CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**International General Certificate of Secondary Education** 

## MARK SCHEME for the May/June 2014 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.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2014 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.



Page 2	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2014	0580	23

## **Abbreviations**

cao correct answer only

dep dependent

FT follow through after error isw ignore subsequent working

oe or equivalent SC Special Case

nfww not from wrong working

soi seen or implied

Qu.	Part	Answers	Mark	Part Marks
1		- 16	1	
2		84	2	M1 for $\frac{7}{6+8+9+7}$ or $\frac{360}{6+8+9+7}$
3		1030	2	<b>M1</b> for 1350 ÷ 1.313
4		$5a(3a^2-b)$	2	<b>B1</b> for $a(15a^2 - 5b)$ or $5(3a^3 - ab)$
5	(a)	0.059161	1	
	(b)	5.9161×10 <sup>-2</sup>	1FT	ft their part (a)
6		$3x^{\circ}y^{4}$	2	<b>B1</b> for $x^6$ or $y^4$ in a product on answer line
7	(a)	74	1	
	(b)	8.69	1	
8		48	2	<b>M1</b> for $15^2$ or $\left(\frac{1}{15}\right)^2$ or $\frac{1}{15^2}$
				or $\sqrt{10800}$ or $\frac{1}{\sqrt{10800}}$
9		$t < -\frac{6}{7}$	2	M1 for $5t + 2t < 17 - 23$ If zero scored SC1 for $-\frac{6}{7}$ with incorrect
		,		inequality sign or equals sign

Page 3	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2014	0580	23

10		$\frac{5}{4} \text{ oe}$ $\frac{5 \times 9}{4 \times 9} \text{ and } \frac{7 \times 4}{9 \times 4} \text{ oe or better}$ $\frac{17}{36} \text{ oe working must be shown}$	B1 M1 FT A1	Do not allow decimals for the <b>B1</b> , <b>M1</b> , or <b>A1</b> e.g. $\frac{45}{36}$ and $\frac{28}{36}$ Follow through their $\frac{5}{4}$ for the <b>M1</b> mark.  Alt method 1: <b>B1</b> for $\frac{1}{4} + \frac{2}{9}$ <b>M1</b> for $\frac{1 \times 9}{4 \times 9}$ and $\frac{2 \times 4}{4 \times 9}$ oe e.g. $\frac{9}{36}$ and $\frac{8}{36}$ Alt method 2: <b>B1</b> for $\frac{1}{4} - \frac{7}{9} + 1$ <b>M1</b> for oe e.g. $\frac{9}{36}$ and $\frac{8}{36}$
11		3.5	3	ISW converting fraction answer to a decimal.  M1 for $y = k \sqrt[3]{x+3}$ A1 for $k = \frac{1}{2}$
				Alternative method: M2 for $\frac{y}{\sqrt[3]{340+3}} = \frac{1}{\sqrt[3]{5+3}}$ oe
12	(a)	(3x-4)(x+2)	2	M1 for $(3x + a)(x + b)$ where $a + 3b = 2$ or $ab = -8$ if M0 then SC1 for $3\left(x - \frac{4}{3}\right)(x + 2)$
	(b)	$1\frac{1}{3}, -2$	1FT	dep on M1
13		y = -0.5x + 11.5 oe	3	B2 for $y = -0.5x + k$ oe or $y = kx + 11.5$ , $k \ne 0$ oe or $-0.5x + 11.5$ oe or B1 for gradient = $-0.5$ oe and B1 for y-intercept = $11.5$ oe If zero scored then, SC1 for $9 = their \ m \times 5 + c$ or $13 = their \ m \times - 3 + c$

Page 4	Mark Scheme	Syllabus	Paper
	IGCSE – Mav/June 2014	0580	23

14		8.23 or 8.234 to 8.235	3	<b>M2</b> for $[PR=]$ $\frac{12.5 \times \sin 37}{\sin 66}$
				or M1 for $\frac{PR}{\sin 37} = \frac{12.5}{\sin 66}$ oe
15		427.8	3	<b>M2</b> for $2 \times (127.35 + 86.55)$ or
		427.4		$2 \times (127.35 + 86.45)$
				or <b>B1</b> for two of these figures: 127.35, 86.55, 127.25, 86.45 seen
				If zero scored, <b>SC2</b> for upper bound 427.8 or lower bound 427.4 provided nfww
16		65.4 or 65.37 to 65.4	4	<b>M3</b> for $\cos = \frac{5}{12}$ or $\frac{\sqrt{3^2 + 4^2}}{12}$ oe
				or M1 for $\sqrt{3^2 + 4^2}$ and M1 for clearly identifying angle <i>GAC</i>
17	(a)	9 1 2 3 8 10 10	2	<b>B1</b> for 2 of the 4 regions correct
	(b)	7 8 10	1FT	
	(c)	1	1FT	
18	(a)	$ \begin{pmatrix} 33 & 16 \\ 32 & 17 \end{pmatrix} $	2	B1 for one column or row correct
	(b)	$\begin{bmatrix} \frac{1}{7} \begin{pmatrix} 3 & -2 \\ -4 & 5 \end{pmatrix} \text{ oe }$	2	<b>B1</b> for $\frac{1}{7} \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ seen or $k \begin{pmatrix} 3 & -2 \\ -4 & 5 \end{pmatrix}$ seen
19		3x + 4y = 10.8 $5x + 2y = 14.50$	1 1	
		2.6[0] 0.75	3	M1 FT for correctly eliminating one variable Al for 2.6 A1 for 0.75 If M0 then or SC1 for correct substitution and correct evaluation to find the other value

Page 5	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2014	0580	23

20	(a)	34	1	
	(b)	16	2	<b>B1</b> for 24 or 40 seen
	(c)	30	1	
	(d)	120	1	
21		62.3 or 62.26 to 62.272	5	<b>M1</b> for $\frac{2}{3} \times 2\pi \times 6$
				and <b>M2</b> for $(\frac{2}{3} + \frac{1}{3}) \times 2\pi \times 4$ oe
				or <b>M1</b> for $\frac{2}{3} \times 2\pi \times 4$ or $\frac{1}{3} \times 2\pi \times 4$ and <b>M1</b> for $2 \times (2+4) + k\pi, k \neq 0$
22	(a)	Triangle at (2,-1) (2,1) (1,-2)	2	<b>B1</b> for translation by $\begin{pmatrix} k \\ -4 \end{pmatrix}$ or $\begin{pmatrix} 3 \\ k \end{pmatrix}$
	(b)	Rotation [centre] (1,0) 180° or half turn	1 1 1	OR enlargement [centre] (1,0) [scale factor] -1
	(c)	Triangle at (2,3) (4,2) (2,5)	3	<b>B2</b> for 2 correct vertices plotted
				or If no/wrong plots allow SC2 for 3 correct coordinates shown in working or SC1 for any 2 correct coordinates shown or a triangle of the correct size and orientation but wrong position
				or <b>M1</b> for $\begin{pmatrix} -2 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} -1 & -1 & -2 \\ 3 & 5 & 2 \end{pmatrix}$ oe shown