

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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Cambridge is publishing the mark schemes for the May/June 2013 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 2013	0580	23

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 $425 \div 1.14$ or 365×1.14
2	$\frac{30}{300}$ oe www	2	M1 for 30 seen or $\frac{k}{300}$ seen
3	1500 or 3 <u>pm</u>	2	B1 for 1h50 or 2h[0]5 or SC1 for 1255 + <i>their</i> 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 $[2 \times](4 \times 10 + 18 \times 5)$ 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

Page 3	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2013	0580	23

10	25	4	<p>M1 for correct method to eliminate one variable</p> <p>A1 for $x = 11$</p> <p>A1 for $y = 3$</p> <p>B1 FT for $2 \times \text{their } x + \text{their } y$ correctly evaluated</p>
11 (a)	77	2	<p>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</p>
(b)	either 18 or 19 or both	2FT	<p>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</p> <p>or for <i>their</i> (a) – 58</p>
12 (a)	$\frac{5}{25}$ oe	2	<p>B1 for answer $\frac{5}{k}$ or $\frac{k}{25}$</p>
(b)	$\frac{4}{25}$ oe	2	<p>B1 for answer $\frac{4}{k}$ or $\frac{k}{25}$</p>
13	$\frac{8x}{(x-3)(x+1)}$	4	<p>B1 for common denominator $(x-3)(x+1)$ seen</p> <p>B1 for $(x+3)(x+1) - (x-1)(x-3)$ soi</p> <p>B1 for $x^2 + 3x + x + 3$ or $x^2 - 3x - x + 3$ soi</p>
14 (a)	$n < 9$	2	<p>M1 for $2n < 18$ or $2n - 18 < 0$ oe</p> <p>If 0 scored SC1 for 9 with incorrect inequality.</p>
(b)	$(b+d)(a+c)$	2	<p>B1 for $b(a+c) + d(a+c)$</p> <p>or $a(b+d) + c(b+d)$</p>
15 (a)	4	2	<p>M1 for attempt at sum of all numeric and x terms equated to 74</p>
(b)	26	1FT	<p>=18 + 2 \times their (a)</p>
(c)	8	1	
16 (a)	1.5	2	<p>B1 for $[g(18) =] 4$</p>
(b)	$2(x+5)$ or $2x+10$	2	<p>M1 for correct first step e.g. $x = \frac{y}{5} - 5$ or</p> <p>$\frac{x}{2} = y + 5$ or $2y = x - 10$</p>

Page 4	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2013	0580	23

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 $\frac{120}{360} \times \pi \times 5^2$ oe M1 for $\frac{1}{2} \times 5^2 \times \sin 120$ oe M1 for $\frac{120}{360} \times \pi \times 5^2 - \frac{1}{2} \times 5^2 \times \sin 120$ 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	= <i>their</i> (b)(i)
20 (a)	$[\pm] 3.1623$ cao	2	M1 for $\sqrt{10}$ 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