

**MARK SCHEME for the October/November 2011 question paper
for the guidance of teachers**

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.

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Page 2	Mark Scheme: Teachers' version	Syllabus	Paper
	IGCSE – October/November 2011	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

Qu.	Answers	Mark	Part Marks
1	112	2	M1 for $240 \div (7 + 8) \times 7$
2	(a) 211 cao (b) 216 cao	1 1	
3	(x =) -3 (y =) 5	2	M1 for correctly eliminating one variable
4	$\frac{16}{81}$ cao	2	B1 for $\frac{81}{16}, \frac{k}{81}, \frac{16}{k}$ or $(2/3)^4$ seen
5	(a) 1.28×10^5 (b) 128 500	1 1	
6	882	2	M1 $800 \times 1.05 \times 1.05$
7	$\frac{1}{9}, \frac{1}{4}$ $\left(\frac{1}{9} + \frac{1}{4} =\right) \frac{4}{36} + \frac{9}{36} = \frac{13}{36}$	M1 E1	Both fractions seen Both fractions over a common denominator and added to give $\frac{13}{36}$
8	0.186	2	B1 for 2.477 to 2.478 or 13.29... seen
9	(a) 5 or -5 (b) -0.714 (-0.7143 to -0.7142) or $-\frac{5}{7}$	1 2	M1 for $-2 + 2 + 1 - 3 - 1 - 2$ and $\div 7$
10	9 h 12 min	3	M1 for 8×1.15 A1 for 9.2 B1 ft independent for their 9.2 correctly converted into hours and minutes
11	$x(p - 2q)(p + 2q)$	3	M2 for $(px - 2qx)(p + 2q)$ or $(p - 2q)(px + 2qx)$ or M1 for $x(p^2 - 4q^2)$
12	225.(23112)	3	M2 for $(800 \div 3.8235 - 150) \times 3.8025$ M1 for $800 \div 3.8235$
13	68.5 www	3	M2 for $67.13 \div 0.98$ or M1 for 67.13 is 98%
14	$66\frac{2}{3}$ or 66.7 www	3	M2 for $\frac{\frac{4}{3}\pi r^3}{\pi r^2(2r)} (\times 100)$ or M1 for $\pi r^2(2r)$
15	$p = \frac{c}{a - x}$	3	M1 one correct move M1 second correct move M1 third correct move marked on answer line

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16	(a) $t = 2\sqrt{l}$ (b) 3	2 1ft	M1 for $t = k\sqrt{l}$ Ft dependent on using $t = k\sqrt{l}$
17	(ii) 7 (ii) 4 (b) $\frac{7}{13}$ oe	1 1 1ft	Ft their Venn diagram or their (a)(i)/13
18	$\frac{1-5x+x^2}{x(1-2x)}$ or $\frac{1-5x+x^2}{x-2x^2}$	4	M1 for $(1-x)(1-2x) - x(2+x)$ seen B1 for $1-x-2x+2x^2$ or $1-3x+2x^2$ seen B1 for $x(1-2x)$ oe as a common denominator
19	4.32	4	M1 for $\frac{50}{360} \times \pi \times 9^2$ M1 for $0.5 \times 9^2 \times \sin 50$ M1 for subtracting their triangle from their sector (dependent on at least M1)
20	(a) (i) 2×2 (ii) (20) (b) $\frac{1}{2} \begin{pmatrix} 4 & -3 \\ -2 & 2 \end{pmatrix}$ oe	1 1 2	Brackets essential M1 for $\frac{1}{2} \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ or $k \begin{pmatrix} 4 & -3 \\ -2 & 2 \end{pmatrix}$ seen
21	(a) 84(.00..) (b) 136	4 1ft	M2 for $\cos(\dots) = \frac{2.7^2 + 4.5^2 - 5^2}{2 \times 2.7 \times 4.5}$ or (M1 for $5^2 = 2.7^2 + 4.5^2 - 2 \times 2.7 \times 4.5 \times \cos C$) A1 for 0.1045... (implied by correct answer) 220 – their (a)
22	(a) Angles in same segment (b) (i) 8.2(0) (ii) 24.7	1 2 2	M1 for $\frac{CX}{3.84} = \frac{9.4}{4.4}$ (= 2.136) oe M1 for $\frac{\Delta}{5.41} = \left(\frac{9.4}{4.4}\right)^2$ (= 4.564) oe
23	(a) 0.133 (3...) or $\frac{2}{15}$ (b) $33\frac{1}{3}$ or 33.3	2 3	M1 for $40 \div 300$ seen M1 for area under graph attempted M1 for correct total area statement