

**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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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