

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

0581 MATHEMATICS

0581/21

Paper 2 (Extended), maximum raw mark 70

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Page 2	Mark Scheme: Teachers' version	Syllabus
	IGCSE – October/November 2011	0581

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	7.5(0) cao	2	M1 for $\frac{258.75}{4.6}$
2	5.92×10^8	2	M1 figs 592 on answer line or M1 296×10^6 oe in working
3	cos38 sin38 sin158 cos158	2	M1 correct decimals seen 0.3(74..) -0.9(271..) 0.7(88..) 0.6(15..)
4	Answer given	3	M1 $\frac{19}{15}$ M1 $\frac{6}{15}$ or $\times \frac{15}{6}$ seen E1 = $\frac{19}{6} = 3\frac{1}{6}$
5	(a) 7853 to 7855 or 7850 or 7860 www (b) 0.7853 to 0.7855 or 0.785 or 0.786	2 1ft	M1 for $\pi \times 50^2$ Their (a) $\div 10\ 000$ evaluated
6	135 cao	3	M1 for 720 or $(6 - 2) \times 180$ oe seen in working and M1 for equation $180 + 4x =$ their 720 or M1 for $(360 - 180) \div 4 (= 45)$ oe seen in working and M1 dep for $180 -$ their 45
7	(a) $(y =) 80$ (b) $(z =) 40$ (c) $(t =) 10$	1 1 1ft	Follow through 90 – their y or 50 – their z
8	2.81(25)	3	M1 $V = k/\sqrt{d}$ or M1 $V = \sqrt{(k/d)}$ A1 $k = 4.5$ A1 $k = 20.25$
9	(a) Correct perpendicular bisector with arcs (b) 60°	2 1	B1 correct line B1 correct construction arcs
10	0.38 or $\frac{19}{50}$	4	B1 0.8, 0.6 or 0.55 then M1 $0.45 \times$ their 0.6 M1 $0.2 \times$ their 0.55 or M2 $1 - (0.45 \times 0.4 + 0.55 \times$ their 0.8)

Page 3	Mark Scheme: Teachers' version	Syllabus
	IGCSE – October/November 2011	0581

11	(a) $\begin{pmatrix} 8 & 5 \\ 20 & 13 \end{pmatrix}$	2	B1 two or three entries correct
	(b) $\begin{pmatrix} 1\frac{1}{2} & -\frac{1}{2} \\ -2 & 1 \end{pmatrix}$ oe	2	B1 $\frac{1}{2}\begin{pmatrix} a & c \\ b & d \end{pmatrix}$ B1 $(k)\begin{pmatrix} 3 & -1 \\ -4 & 2 \end{pmatrix}$
12	(a) Negative	1	Ignore embellishments
	(b) Correct point	1	
	(c) (i) Accurate ruled line	1	
	(ii) English mark	1ft	Follow through their (c)(i)
13	(a) $\frac{1}{2}\mathbf{a} + \frac{1}{2}\mathbf{b}$ oe	2	M1 unsimplified or any correct route e.g $\mathbf{a} + \frac{1}{2}(\mathbf{b} - \mathbf{a})$ or OA + AC
	(b) $-1\frac{1}{2}\mathbf{a} + 1\frac{1}{2}\mathbf{b}$ oe	2	M1 unsimplified or any correct route e.g $\mathbf{CD} = 1\frac{1}{2}\mathbf{AB}$ or $\mathbf{b} - \mathbf{a} + \frac{1}{2}(\mathbf{b} - \mathbf{a})$
14	(a) 2.84	2	M1 correct substitution of g and l seen
	(b) $\frac{4\pi^2 l}{T^2}$ oe	3	M1 each correct move but third move marked on answer line
15	(a) 156	4	M1 intention to find area under graph B2 completely correct area statement or B1 two areas found correctly (or one trapezium area)
	(b) 12	1ft	Their (a)/13
16	(a) 3.61	3	M1 $(3 - 1)^2 + (0 - 3)^2$ oe M1 $\sqrt{2^2 + 3^2}$
	(b) $y = \frac{1}{2}x + 2\frac{1}{2}$ oe	3	B2 $y = \frac{1}{2}x + k$ or $y = kx + 2\frac{1}{2}$ or B1 $kx + 2\frac{1}{2}$ or $\frac{1}{2}x + k$ If 0 scored B1 $m = \frac{1}{2}$ B1 $c = 2\frac{1}{2}$ clearly identified in working

Page 4	Mark Scheme: Teachers' version	Syllabus
	IGCSE – October/November 2011	0581

17	(a) $\frac{1}{2}$	2	B1 $f(-2)$ seen
	(b) $\sqrt[3]{x-1}$ or $\sqrt[3]{x-1}$	2	M1 $x-1 = y^3$ or $\sqrt[3]{y-1}$
	(c) 1 2	3	M2 $(x-1)(x-2) = 0$ or M1 $(x+a)(x+b) = 0$ where $ab = 2$ or $a+b = -3$ If 0 scored give M1 for $x^2 - 3x + 2 = 0$
18	(a) 4324 cao	2	M1 $\frac{1}{6} \times 23 \times 24 \times 47$ or better
	(b) (i) 4, 9	2	B1 either correct
	(ii) $(n+1)^2$ or $n^2 + 2n + 1$	1	
	(c) $\frac{2}{3}n(n+1)(2n+1)$ oe	2	M1 recognising $V_n = 4T_n$