

**MARK SCHEME for the May/June 2010 question paper**  
**for the guidance of teachers**

<p><b>0581/22</b></p>	<p><b>0581 MATHEMATICS</b></p> <p>Paper 22 (Extended), maximum raw mark 70</p>
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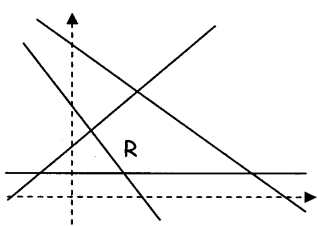
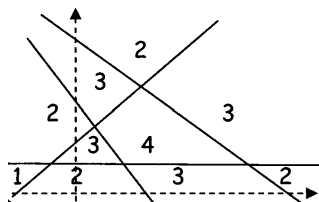
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Mark schemes must be read in conjunction with the question papers and the report on the examination.

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	IGCSE – May/June 2010	0581	22

Qu.	Answers	Mark	Part Marks
1	(a) 1 (b) 1	1 1	Allow none
2	0	2	<b>M1</b> $4\sin^3 120$ evaluated and rounding to 2.6 or better (2.598...) or $\frac{3\sqrt{3}}{2}$
3	$2 - \sqrt{3}, 2 - \frac{\sqrt{3}}{2}, \frac{2}{\sqrt{3}}, \sqrt{3}$	2	<b>M1</b> correct decimals seen
4	$\frac{15a+32}{40}$ oe	2	<b>B1</b> $15a + 32$ seen or <b>SC1</b> $\frac{15a}{40} + \frac{32}{40}$ on answer line
5	$2^{10}$	2	<b>M1</b> $2^6$ or $2^{-4}$ seen
6	$6.4 \times 10^7$	2	<b>M1</b> $64 \times 100^2 \times 10^2$ or 64 000 000 oe
7	$(A \cup B \cup C)'$ $(A \cup C)' \cap B$	1 1	or $A' \cap B' \cap C'$ or $A' \cap (B \cup C)'$ or $A' \cap C' \cap B$
8	(a) 43 to 47 (b) 64 to 68	1 2	<b>SC1</b> 23 to 27
9	63.84 <b>cao</b>	3	<b>M1</b> figs 1995 <b>M1</b> $32 \times$ their lower bound
10	$x = \frac{3}{P-1}$	4	<b>M1</b> for each of the four moves completed correctly
11	(a) 10(.0.) (b) 9.80	1 3	<b>M2</b> $\sqrt{((a)^2 - 2^2)}$ or <b>M1</b> $PT^2 + 2^2 = (a)^2$
12	(a) 440 (b) 3 min 20 sec	2 2	<b>M1</b> $\sin 37.1$ or $\cos 52.9 = \frac{h}{730}$ oe <b>M1</b> $\frac{730}{3.65}$
13	(a) $\begin{pmatrix} 6x-3 \\ 4x+5 \end{pmatrix}$ but not $\begin{pmatrix} 6x & -3 \\ 4x & (+)5 \end{pmatrix}$ (b) $(6x^2 + x + 5)$ cao	2 2	<b>B1</b> $6x - 3$ or <b>B1</b> $4x + 5$ in a $(2 \times 1)$ matrix on answer line <b>M1</b> any $1 \times 1$ matrix in answer space
14		4	Mark the position of the letter R (or the worst unshaded region if R is missing) as follows 

<b>Page 3</b>	<b>Mark Scheme: Teachers' version</b>	<b>Syllabus</b>	<b>Paper</b>
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<b>15</b>	<b>(a)</b> (2, 4)	1	
	<b>(b)</b> (6, 0)	1	
	<b>(c) (i)</b> (4, 2) ft	1ft	From <b>(a)</b> and <b>(b)</b>
	<b>(ii)</b> $y = -3x + 14$ oe	2	<b>M1</b> sub their <b>(c)(i)</b> into $y = -3x + c$ oe
<b>16</b>	$16 \frac{1}{4}$ or 16.3	5	<b>M1</b> finding the area under graph <b>A1</b> 130 <b>M1</b> $\frac{1}{2} \times 16 \times v$ <b>M1</b> equating and solving
<b>17</b>	<b>(a)</b> 201	2	<b>M1</b> $\pi \times 8^2$
	<b>(b)</b> 87.9 or 88.0	4	<b>M1</b> $\frac{45}{360} \times 2 \times \pi \times 12 \dots d$ <b>M1</b> $2 \times \pi \times 8 \dots e$ <b>M1 ft</b> for their (4d + e) which must come from multiples of $\pi$ <b>SC2</b> 43.9 or 44.0
<b>18</b>	<b>(a) (i)</b> 11	1	
	<b>(ii)</b> $1 - 6x$	2	<b>M1</b> $3(1 - 2x) - 2$
	<b>(b)</b> -1.65, 6.65	4	<b>M1</b> $\frac{5 \pm k}{2}$ <b>M1</b> $\sqrt{(-5)^2 - 4 \times 1 \times (-11)}$ or better <b>A1 A1</b>
<b>19</b>	<b>(a)</b> 6, 30, 70	2	<b>B1</b> for 2 correct
	<b>(b)</b> graph	3	<b>P2</b> 7 plots correct from table <b>P1</b> 5 or 6 plots correct from table <b>C1</b> smooth curve through the points in the given range within one small square of the plots or the correct position
	<b>(c)</b> 82.5 or ft $\pm 1$	1ft	
	<b>(d)</b> 108 or ft $\pm 1$	1ft	