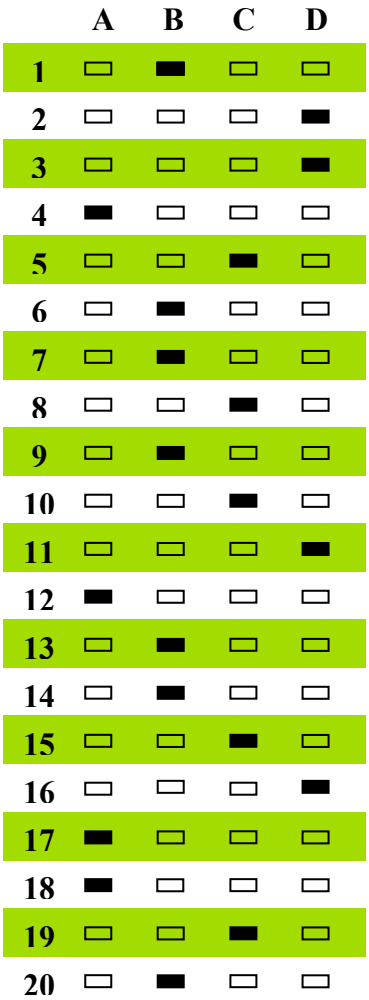
Higher Grade - Paper 1 2009/2010 **ANSWERS - Section A**

1	B
2	D
3	D
4	A
5	C
6	B
7	B
8	C
9	B
10	C
11	D
12	A
13	B
14	B
15	C
16	D
17	A
18	A
19	C
20	B



	Give 1 mark for each •	Illustration(s) for awarding each mark
21(a)	**ans: A(3, 9) (4 marks)**	
	•[1] equates 2 equations and collects to LHS	•[1] $4x^2 - x^3 = 3x; 4x^2 - x^3 + 3x = 0$
	•[2] factorises	•[2] $x(x-3)(x-1) = 0$
	•[3] solves for x chooses appropriate value	•[3] $x = 0, 1, 3; x = 3$
	•[4] substitutes and states point A	•[4] $y = 3 \times 3 = 9$; A(3, 9)
(b)	**ans: $y + 3x = 18$ (4 marks)**	
	•[1] know to take derivative	•[1] $\frac{dy}{dx} = 8x - 3x^2$
	•[2] knows to substitute	•[2] $8(3) - 3(3)^2$
	•[3] evaluates to find gradient	•[3] $m = -3$
	•[4] substitutes into $y - b = m(x - a)$	•[4] $y - 9 = -3(x - 3)$
22(a)	**ans: p = -7 (3 marks)**	
	•[1] setting up synthetic division	•[1] -2 |1 0 p -6
	•[2] remainder	•[2] -2p -14 = 0
	•[3] answer	•[3] p = - 7
(b)	**ans: x = 3 (4 marks)**	
	•[1] partial factorisation	•[1] $(x + 2)(x^2 - 2x - 3) = 0$
	•[2] complete factorisation	•[2] $(x + 2)(x - 3)(x + 1) = 0$
	•[3] Correct roots	•[3] x = - 2, x = 3, x = - 1
	•[4] interprates solution	•[4] x = 3

	Give 1 mark for each •	Illustration(s) for awarding each mark
23(a)	**ans: proof (2 marks)**	
	•[1] cross multiplies	•[1] $5x(x+k^2)=4(x^2-k^2)$
	•[2] multiplies brackets and collects terms	•[2] $5x^2+5k^2x=4x^2-4k^2$ $5x^2+5k^2x-4x^2+4k^2=0$
(b)	**ans: $k=\pm\frac{4}{5}$ (4 marks)**	
	•[1] knows condition for equal roots	•[1] $b^2-4ac=0$ [stated or implied]
	•[2] substitutes values	•[2] $(5k^2)^2-4\times1\times4k^2=0$ $25k^4-16k^2=0$
	•[3] factorises	•[3] $k^2(5k-4)(5k+4)=0$
	•[4] solves and chooses values for k	•[4] $k=0;\pm\frac{4}{5}$
24(a)	**ans: proof (4 marks)**	
	•[1] finds expressions for missing dimensions	•[1] $(6-2x)$ and $(4-x)$
	•[2] finds area of triangles	•[2] $x(6-2x)$ and $2x(4-x)$
	•[3] subtracts from area of rectangle	•[3] $24-(6x-2x^2+8x-2x^2)$
	•[4] simplifies to answer	•[4] $24-6x+2x^2-8x+2x^2$
(b)	**ans: $\frac{7}{4}$; $11\frac{3}{4}$ (5 marks)**	
	•[1] knows to make derivative equal to 0	•[1] $\frac{dy}{dx}=0$
	•[2] finds derivative a	•[2] $\frac{dy}{dx}=8x-14=0$
	•[3] solves for x and justifies	•[3] $x=\frac{7}{4}$; table of values or second derivative
	•[4] subs value to find area	•[4] $a=4\left(\frac{7}{2}\right)^2-14\left(\frac{7}{4}\right)+24$
	•[5] answer	•[5] $11\frac{3}{4}$

Total: 70 marks