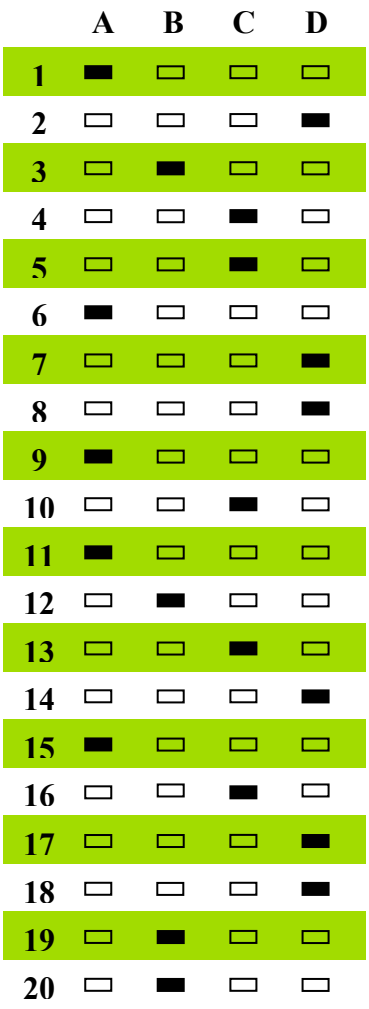
Please make sure you have filled in all your details above before handing in this answer sheet.

Higher Grade - Paper 1 2010/2011 **ANSWERS - Section A**

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



	Give 1 mark for each •	Illustration(s) for awarding each mark
21(a)	**ans: $p = -3$ (4 marks)**	
	•[1] finds $\frac{dy}{dx}$	•[1] $\frac{dy}{dx} = 6x^2 + 2px - 12$
	•[2] knows to sub $x = -1$	•[2] $\frac{dy}{dx} = 6(-1)^2 + 2p(-1) - 12$
	•[3] equates $\frac{dy}{dx}$ to 0	•[3] $6 - 2p - 12 = 0$
	•[4] solves for p	•[4] $p = -3$
(b)	**ans: B(2, –20) (4 marks)**	
	•[1] equates $\frac{dy}{dx}$ to 0	•[1] $\frac{dy}{dx} = 6x^2 - 6x - 12 = 0$
	•[2] factorises and solves for x	•[2] $6(x-2)(x+1) = 0;\ x = 2, -1$
	•[3] subs approp. value to find y-coordinate	•[3] $y = 2(2)^3 - 3(2)^2 - 12(2) = -20$
	•[4] states coordinates of B	•[4] B(2, –20)
(c)	**ans: $y = -12x - 1$ (3 marks)**	
	•[1] subs into equation to find y-coord. of C	•[1] $y = 2(1)^3 - 3(1)^2 - 12(1) = -13$ C(1, –13)
	•[2] subs into derivative to find gradient	•[2] $6(1)^2 - 6(1) - 12 = -12$
	•[3] subs into straight line equation	•[3] $y + 13 = -12(x - 1)$
22	**ans: $\theta = \frac{2\pi}{3}$; $\theta = \frac{4\pi}{3}$ (6 marks)**	
	•[1] multiplies and brings terms to LHS	•[1] $2\cos^2\theta - \cos\theta - 1 = 0$
	•[2] factorises	•[2] $(2\cos\theta + 1)(\cos\theta - 1)$
	•[3] solves for cos θ	•[3] $\cos\theta = -\frac{1}{2}$
	•[4] finds solutions for 1 bracket	•[4] $\theta = \frac{2\pi}{3}, \frac{4\pi}{3}$
	•[5] finds solution for second bracket	•[5] $\theta = 0, 2\pi$
	Interprets domain	$\theta = 0,$ 2

	Give 1 mark for each •	Illustration(s) for awarding each mark
23(a)	**ans**: $a = \frac{1}{2}$ **(2 marks)**	
	•[1] substitutes values	•[1] $38 = a \times 36 + 20$
	•[2] solves for a	•[2] $a = \frac{1}{2}$
(b)	**ans: 40** **(2 marks)**	
	•[1] knows how to find limit	•[1] $L = \frac{20}{\frac{1}{2}}$
	•[2] answer	•[2] 40
(b)	**ans: $k = 5$** **(3 marks)**	
	•[1] knows to find U_0	•[1] evidence of working backwards to U_0
	•[2] evaluates U_0	•[2] $U_2 = 32$; $U_1 = 24$; $U_0 = 8$;
	•[3] finds k	•[3] $k = \frac{40}{8} = 5$
24(a)	**ans: proof** **(3 marks)**	
	•[1] finds length of BD	•[1] BD = $\sqrt{8}$
	•[2] finds expression for sin x.	•[2] $\sin x = \frac{\sqrt{8}}{\sqrt{12}}$
	•[3] simplifies to answer	•[3] $\sin x = \frac{\sqrt{8}}{\sqrt{12}} = \frac{2\sqrt{2}}{2\sqrt{3}} = \frac{\sqrt{2}}{\sqrt{3}}$
(b)	**ans: proof** **(3 marks)**	
	•[1] knows to use cosine rule	•[1] finds length BD = $4\sqrt{2}$
	•[2] finds cos BAC	•[2] $\cos BAC = \frac{(\sqrt{12})^2 + (\sqrt{12})^2 - (4\sqrt{2})^2}{2x\sqrt{12}x\sqrt{12}}$
	•[3] substitutes and simplifies to answer	•[3] $\cos BAC = -\frac{1}{3}$

Total: 70 marks