

Higher Grade - Paper 1 2008/2009

ANSWERS - Section A

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

	A	B	C	D
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	Give 1 mark for each •	Illustration(s) for awarding each mark
21(a)	ans: P(2, 4) (4 marks)	
	<ul style="list-style-type: none"> •¹ knows to make derivative equal to 0 •² finds derivative •³ solves for x •⁴ states coordinates of P 	<ul style="list-style-type: none"> •¹ $\frac{dy}{dx} = 0$ •² $\frac{dy}{dx} = 6x - 3x^2 = 0$ •³ $3x(2 - x) = 0; x = 0, 2$ •⁴ P(2, 4)
(b)	ans: Q(-1, 4) (3 marks)	
	<ul style="list-style-type: none"> •¹ knows to equate functions •² uses app method to factorise expression •³ solves and states coordinates of Q 	<ul style="list-style-type: none"> •¹ $3x^2 - x^3 = 4$ •² evidence leading to $(x - 2)(x - 2)(x + 1)$ •³ Q(-1, 4)
(c)	ans: $6\frac{3}{4}$ units² (6 marks)	
	<ul style="list-style-type: none"> •¹ knows to use integration •² uses correct integration •³ integrates •⁴ subs values •⁵ evaluates •⁶ subtracts from 12 to answer 	<ul style="list-style-type: none"> •¹ $\int \dots\dots$ •² $\int_{-1}^2 3x^2 - x^3 dx$ •³ $\left[x^3 - \frac{x^4}{4} \right]_{-1}^2$ •⁴ $\left[(2)^3 - \frac{(2)^4}{4} \right] - \left[(-1)^3 - \frac{(-1)^4}{4} \right]$ •⁵ $(8 - 4) - (-1 - \frac{1}{4}) = 4 + 1\frac{1}{4} = 5\frac{1}{4}$ •⁶ $12 - 5\frac{1}{4} = 6\frac{3}{4}$ units²
22(a)	ans: $p = 1, q = -4, r = 3$ (4 marks)	
	<ul style="list-style-type: none"> •¹ substitutes •² multiplies out and reorganises •³ states values of p, q and r •⁴ states values of p, q and r 	<ul style="list-style-type: none"> •¹ $f(g(a)) = (2 - a)^2 - 1$ •² $4 - 4a + a^2 - 1 = a^2 - 4a + 3$ •³ $p = 1, q = -4, r = 3$ •⁴ award 1 mark for any two correct and 1 mark for third value correct
(b)	ans: $a = 5$ (2 marks)	
	<ul style="list-style-type: none"> •¹ equates to 8, reorganises and factorises •² solves and chooses correct value for a 	<ul style="list-style-type: none"> •¹ $a^2 - 4a + 3 = 8; a^2 - 4a - 5 = 0$ $(a - 5)(a + 1) = 0$ •² $a = 5$

	Give 1 mark for each •	Illustration(s) for awarding each mark
23	<p>ans: $A\left(\frac{11\pi}{12}, \frac{1}{2}\right)$ (4 marks)</p> <ul style="list-style-type: none"> •¹ equates line & curve, reorganises •² finds values for $2x$ •³ finds values for x •⁴ states coordinates of A 	<ul style="list-style-type: none"> •¹ $\sin 2x + 1 = \frac{1}{2}; \sin 2x = -\frac{1}{2}$ •² $2x = \frac{7\pi}{6}, \frac{11\pi}{6}$ •³ $x = \frac{7\pi}{12}, \frac{11\pi}{12}$ •⁴ $A\left(\frac{11\pi}{12}, \frac{1}{2}\right)$
24(a)	<p>ans: 60 (2 marks)</p> <ul style="list-style-type: none"> •¹ knows how to find limit •² moves term to LHS and divides 	<ul style="list-style-type: none"> •¹ $L = \frac{24}{1 - 0.6}$ •² 60
(b)	<p>ans: 10 (2 marks)</p> <ul style="list-style-type: none"> •¹ makes RR equal to 30 •² solves for U_0 	<ul style="list-style-type: none"> •¹ $0.6U_0 + 24 = 30$ [stated or implied] •² $0.6U_0 = 6; U_0 = 10$
(c)	<p>ans: $a = \frac{2}{5}; b = 36$ (3 marks)</p> <ul style="list-style-type: none"> •¹ subs for b and finds expression for limit •² equates limit to 60 and solves for a •³ finds value of b 	<ul style="list-style-type: none"> •¹ $U_{n+1} = aU_n + 90a; L = \frac{90a}{1-a}$ •² $\frac{90a}{1-a} = 60; 60 - 60a = 90a; a = \frac{2}{5};$ •³ $b = 90 \times \frac{2}{5} = 36$