

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

Higher Grade - Paper 1 2011/2012

ANSWERS - Section A

		A	B	C	D
1	B	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	B	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	C	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	C	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	D	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	C	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	B	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	C	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10	A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
12	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
13	B	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	C	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15	B	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
17	B	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	C	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
19	A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	C	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

	Give 1 mark for each •	Illustration(s) for awarding each mark
21(a)	ans: Q(9, 7); ($\sqrt{45}$) or $3\sqrt{5}$ (3 marks) <ul style="list-style-type: none"> •¹ states centre of C_2 •² knows how to find radius •³ evaluates 	<ul style="list-style-type: none"> •¹ Q(9, 7) •² $r^2 = 9^2 + 7^2 - 85$ •³ $r = \sqrt{45}$ or $3\sqrt{5}$
(b)	ans: proof (3 marks) <ul style="list-style-type: none"> •¹ finds distance between centres •² finds total of 2 radii •³ conclusion 	<ul style="list-style-type: none"> •¹ $PQ^2 = 8^2 + 4^2$; $PQ = \sqrt{80} = 4\sqrt{5}$ •² $\sqrt{5} + 3\sqrt{5} = 4\sqrt{5}$ •³ distance between centres = sum of radii so circles touch at one point
22	ans: a = 2 (5 marks) <ul style="list-style-type: none"> •¹ prepares to integrate •² integrates •³ subs and equates to 8 •⁴ factorises (uses synthetic division) •⁵ realises only solution is 2 	<ul style="list-style-type: none"> •¹ $\int_0^a 16 - 24x + 9x^2 dx$ •² $[16x - 12x^2 + 3x^3]_0^a$ •³ $16a - 12a^2 + 3a^3 = 8$ •⁴ $(a - 2)(3a^2 - 6a + 4) = 0$ •⁵ $a = 2$
23(a)	ans: y = 4x - 9 (4 marks) <ul style="list-style-type: none"> •¹ find coordinates of S •² finds gradient of AB •³ knows to use parallel gradient •⁴ subs info into equation of straight line 	<ul style="list-style-type: none"> •¹ S(4, 7) •² $m_{AB} = \frac{5+3}{-2+4} = 4$ •³ $m = 4$ •⁴ $y - 7 = 4(x - 4)$
(b)	ans: D(2, -1) (2 marks) <ul style="list-style-type: none"> •¹ evidence of 'stepping out' or other suitable method •² answer 	<ul style="list-style-type: none"> •¹ evidence of suitable strategy •² D(2, -1)

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24(a)	ans: $4x + 3y - 36 = 0$ (4 marks) <ul style="list-style-type: none"> •¹ finds centre •² finds gradient of radius •³ states gradient of tangent •⁴ subs value into formula 	<ul style="list-style-type: none"> •¹ (2,1) •² $\frac{3}{4}$ •³ $-\frac{4}{3}$ •⁴ $y - 4 = -\frac{4}{3}(x - 6)$
25	ans: $k = \frac{1}{2}$ (7 marks) <ul style="list-style-type: none"> •¹ knows to sub line into circle •² multiplies •³ simplifies •⁴ solves for y •⁵ subs to find x •⁶ subs point into line •⁷ solves for k 	<ul style="list-style-type: none"> •¹ $(3y + 10)^2 + y^2 - 4(3y + 10) - 8y - 20 = 0$ •² $9y^2 + 60y + 100 + y^2 - 12y - 40 - 8y - 20 = 0$ •³ $10y^2 + 40y + 40 = 0$ •⁴ $10(y^2 + 4y + 4) = 0; (y + 2)^2 = 0; y = -2$ •⁵ $x = 3(-2) + 10 = 4$ •⁶ $-2 = 4k - 4$ •⁷ $k = \frac{1}{2}$

Total: 68 marks