Question	Scheme	Marks	AOs
7(a)	$\frac{dy}{dx} = (2x-5)e^{x^2} + 2x(x^2-5x+8)e^{x^2}$	M1 A1	1.1b 1.1b
	$= (2x^3 - 10x^2 + 18x - 5)e^{x^2}$ *	A1*	2.1
		(3)	
(b)	Sign change, function is continuous therefore $0.3 < \alpha < 0.4$	B1	2.4
		(1)	
(c)	$\frac{dy}{dx} = 0 \Rightarrow (2x^3 - 10x^2 + 18x - 5)e^{x^2} = 0$ $\Rightarrow 2x^3 - 10x^2 + 18x - 5 = 0$	B1	2.2a
	$\Rightarrow 2x^3 + 18x = 10x^2 + 5 \Rightarrow 2x(x^2+9) = 5(2x^2+1) \Rightarrow x = ...$	M1	2.1
	$x = \frac{5(2x^2+1)}{2(x^2+9)}$*	A1*	1.1b
		(3)	
(d)(i)	$x_1 = 0.3 \Rightarrow x_2 = \frac{5(2(0.3)^2+1)}{2((0.3)^2+9)} = ...$	M1	1.1b
	$x_3 = 0.3324$	A1	1.1b
(d)(ii)	$\alpha = 0.3364$	A1	2.2a
		(3)	
			(10 marks)

Notes

(a)

M1: Correct application of the product rule.

A1: Correct derivative in any form.

A1*: Correct proof with no errors.

(b)

B1: Correct explanation.

(c)

B1: Deduces $2x^3 - 10x^2 + 18x - 5 = 0$

M1: Collects appropriate terms to each side and makes x the subject.

A1*: Correct proof.

(d)(i)

M1: Substitutes $x = 0.3$ into the given iterative formula. May be implied by $x_2 = \frac{295}{909}$ or $x_2 = 0.324...$

A1: $x_3 =$ awrt 0.3324

(d)(ii)

A1: Correct value as shown.