Question	Scheme	Marks
6(a)	$\dfrac{dy}{dx}=\dfrac{\left(x^2+1\right)2xe^{\left(x^2+1\right)}-2xe^{\left(x^2+1\right)}}{\left(x^2+1\right)^2}$	M1A1A1
	$\dfrac{dy}{dx}=\dfrac{2xe^{\left(x^2+1\right)}\left(x^2+1-1\right)}{\left(x^2+1\right)^2}=\dfrac{2x^3e^{\left(x^2+1\right)}}{\left(x^2+1\right)^2}$	M1A1 cso [5]
(b)	When $x=-1$ $\dfrac{dy}{dx}=\dfrac{-e^2}{2}$, $y=\dfrac{e^2}{2}$	B1ft, B1
	$y-\dfrac{e^2}{2}=-\dfrac{e^2}{2}(x+1),\Rightarrow y=-\dfrac{e^2x}{2}$ oe	M1A1ft, A1 [5]
		Total 10 marks

Question	Notes	Marks
6(a)	$y=\dfrac{e^{\left(x^2+1\right)}}{x^2+1}$	
	Using Quotient Rule $\dfrac{dy}{dx}=\dfrac{\left(x^2+1\right)2xe^{\left(x^2+1\right)}-2xe^{\left(x^2+1\right)}}{\left(x^2+1\right)^2}$ • For an attempt to differentiate both $e^{\left(x^2+1\right)}$ and x^2+1 Award for either $e^{x^2+1}\Rightarrow 2xe^{x^2+1}$ or $x^2+1\Rightarrow 2x$ but both must be **changed** expressions. • Numerator is to have two terms in either order **subtracted.** • Denominator must be $\left(x^2+1\right)^2$	M1
	At least one term fully correct in the numerator	A1
	Fully correct unsimplified.	A1
	For an attempt to take out a common factor of either $2x$ or $e^{\left(x^2+1\right)}$ $\dfrac{dy}{dx}=\dfrac{2xe^{\left(x^2+1\right)}\left(x^2+1-1\right)}{\left(x^2+1\right)^2}$ OR Multiplies out the first term in the numerator $\dfrac{2x^3e^{\left(x^2+1\right)}+2xe^{\left(x^2+1\right)}-2xe^{\left(x^2+1\right)}}{\left(x^2+1\right)^2}$	M1 [M1]

	Using Product Rule	
	$\frac{dy}{dx} = \left(x^2+1\right)^{-1} \times 2xe^{x^2+1} + (-2x)e^{x^2+1} \times \left(x^2+1\right)^{-2}$ • For an attempt to differentiate both $e^{\left(x^2+1\right)}$ and $\left(x^2+1\right)^{-1}$ Award for either $e^{x^2+1} \Rightarrow 2xe^{x^2+1}$ or $\left(x^2+1\right)^{-1} \Rightarrow (-2x)\left(x^2+1\right)^{-2}$ but both must be **changed** expressions. • Numerator is to have two terms added	M1
	At least one term correct	A1
	Fully correct unsimplified or simplified	A1
	For an attempt to take out a common factor of either $2x$ or $e^{\left(x^2+1\right)}$ and set a common denominator of $\left(x^2+1\right)^2$	M1
	For the fully correct expression for the derivative, $\frac{dy}{dx} = \frac{2x^3e^{\left(x^2+1\right)}}{\left(x^2+1\right)^2}$ NB: Any further simplification [e.g., cancelling $\left(x^2+1\right)$] following a correct answer seen, is A0.	A1 [5]
(b)	When $x = -1$, $\frac{dy}{dx} = \frac{-e^2}{2}$ ft their K in their $\frac{dy}{dx}$ Allow awrt $\frac{dy}{dx} = -3.7$ Even allow $\frac{dy}{dx} = \frac{-Ke^2}{4}$	B1ft
	When $x = -1$, $y = \frac{e^2}{2}$ Allow awrt $y = 3.7$	B1
	For a correctly used method for the equation of the tangent using their values for $\frac{dy}{dx}$ and y $y - '\frac{e^2}{2}' = '-\frac{e^2}{2}'(x+1)$ Also allow: $y - 3.7 = -3.7(x+1)$ If they use $y = mx + c$ they must obtain a value for c for the award of this mark.	M1
	For the correct equation in any form	A1ft
	For a correct simplified equation in any form but this must be in exact form. $y = -\frac{e^2x}{2}$ or $2y + e^2x = 0$	A1 [5]
		Total 10 marks