Question 1  Is $y = e^{-kx} [\alpha \cos x + \beta \sin x]$ is solution of the second order equation

$$\frac{d^2 y}{dx^2} + 2k \frac{dy}{dx} + (k^2 + 1)y = 0?$$

Question 2  Solve the Differential Equation $(x^2 + 4) \frac{dy}{dx} = \cos ec^2 y$ with $y(\frac{\pi}{4}) = \frac{\pi}{4}$