11. (a) Show that the equation

$$3x^3 - 8x^2 + x + 3 = 0$$

has a solution between 0 and 1, a solution greater than 1, and a solution less than 0. State carefully the theorem (not just its name) that you are using to make these deductions. [5]

(b) Given that $y = e^{-2x} \cos 3x$, find constants A and B such that

$$\frac{d^2y}{dx^2} + A\frac{dy}{dx} + By = 0$$

for all values of x. [5]