

Q1. The nonlinear DE $xydx + (2x^2 + 3y^2 - \alpha)dy$ is not exact. Find an integrating factor (if possible) to make it an exact differential equation. Find a family $\phi(x, y) = c$ of solutions of the equation.

Q2. Use an appropriate substitution to solve $x \frac{dy}{dx} + y = x^2 y^2$.

Q3. When green tea cup is removed from the oven its temperature was 300°F . Three minutes later its temperature became 200°F . How long it will take for the tea to cool off to a room temperature of 70°F ?
