Q1. Verify that $2x^2y + xy^2 + e^y = c$ is an implicit solution of the differential equation

$$\frac{dy}{dx} = -\frac{y(4x + y)}{2x^2 + 2xy + e^y}$$

Q2. Determine the region in which $y' = \sqrt{y^2 - 16}$ has a unique solution whose graph passes through a point $(x_o, y_o)$. 


Q3. Use separation of variables method to find an **explicit** solution of the initial value problem

\[
\frac{dy}{dx} = \frac{y^2 - 1}{x^2 - 1}, \quad x(2) = 2
\]