

Provide a clear and organized presentation. Show all of your work and completely simplify your answers. Solve the following differential equation:

$$e^y (3x^3 + 4x^2 + 10x + 3) \frac{dy}{dx} = (6x^3 + 15x^2 + 24x + 1) \sqrt{e^{2y} - 1} \ln(e^y + \sqrt{e^{2y} - 1})$$