1. Find $y(1)$ if $\frac{dy}{dx} = \frac{e^x}{2y+1}$, $y(0) = -2$. You must show all your work for full credit.

2. A professor asked if the solution to the initial value problem, $\frac{dy}{dx} = 3x^2y^2$, $y(0) = 1$ could ever take a negative value. Pat argues that $y$ can’t be negative, since $3x^2y^2 \geq 0$, so the derivative is always non-negative, hence $y$ is always increasing or flat, and since we increase from $y = 1$, $y$ must always be positive. On the other hand, Lee solves the equation to get $y = \frac{1}{1-x^3}$, and then computes $y(2) = -\frac{1}{7} < 0$, hence $y$ can be negative. Write a paragraph to explain whether Pat or Lee or neither (or both) are right. The paragraph will be graded on correctness (whether you pick the correct explanation or explanations), completeness (whether you explain why any incorrect explanations are wrong, or, if you want to say both are correct, how you resolve the contradiction between them), and clarity (whether the grader has difficulty understanding what you mean). Failure to use proper grammar and spelling will reduce the clarity of your answer. You may include mathematical equations in your answer and may refer to graphs you draw.