Problem 1. Solve the following initial value problem \([4.5 \text{ points}]\) and indicate which, if any, solutions were lost while separating variables \([.5 \text{ points}]\).

\[
\frac{dy}{dx} = xy
\]

With initial value \(y(2) = 1\).

Problem 2. Find the general solution to the differential equation.

\[
\frac{dy}{dx} + 1 + y^2 = 0
\]