MAP 2302: Worksheet June 20, 2019   **Group nr:** _____

1. Check whether the following differential equation is exact and, if it is, find its implicit general solution.

$$(ye^x + 2e^x + y^2)\,dx + (e^x + 2xy + 1)\,dy = 0$$

2. Recognize the differential equation $(xy + y^2 + x^2)\,dx - x^2\,dy = 0$ as one of the types that we studied already, and then find one solution $y(x)$ (explicit formula, if possible) that satisfies the initial condition $y(1) = 1$. Is this solution guaranteed to be unique? Briefly explain.