Problem 1: Identification (10 min) 10 POINTS  Show all Work!

1) \((ye^{-2x} + y^2)dx - e^{-2x}dy = 0\) a) linear DE equation
2) \((y - 4x - 1)^2 dx - dy = 0\) b) Homogeneous
3) \(x(y - 1)dx + (x^2 + 1)dy = 0\) c) Exact
4) \((1 + \ln(y))dt + (t/y)dy = 0\) d) Form: \(y' = G(ax + by)\)
5) \((y^3 - \theta y^2)d\theta + 2\theta^2 ydy = 0\) e) Bernoulli (not linear)

Matching problem: Match the differential equation on the left with one of the descriptions to the right. Consider \(y\) as the dependent variable. Use tests and definitions to justify your choice. (1 point for the match, 1 point for explanation)
Problem 1: Workspace Show all Work!
Problem 2: (10 min) 8 POINTS  Show all Work!

Solve the linear Differential equation in problem 1:
Problem 3: (10 min) 7 POINTS  Show all Work

Solve the exact equation in problem 1: