INSTRUCTIONS: PLEASE READ CAREFULLY
Write your name and section number above. 5 pts will deducted if either is missing or illegible.
Show your work and put a box or circle around your answers.

Problem 1. Name the equation type (10 pts). Find the general solution (20 pts) and the solution of
the initial value problem (10 pts).

$$\frac{dy}{dx} = \frac{-y + \sin x}{x}, \quad y(\pi) = 1$$

Problem 2. Name the equation type (10 pts) and find the general solution (20 pts).

$$\frac{dy}{dx} = -\frac{3y^2 + 2y}{6xy + 2x + 6}$$

Problem 3. Name the equation type (10 pts) and find the general solution (20 pts).

$$\frac{dy}{dt} - t(y^2 + 1) = 0, \quad y(0) = 1$$

Bonus:
(a) What is the general form of a 1st order Bernoulli ODE?
(b) What is the appropriate substitution?
(c) Plug the substitution into the ODE and show it results in a first order linear ODE.