King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
Math 202 (153) Sec - Quiz 1

Name: ID: Serial No.:

1. Determine the order and state whether the following ODEs are linear or nonlinear (Give a brief justification).

   (a) $\dfrac{d^3y}{dx^3} + (1+\sqrt{x})(\dfrac{dy}{dx})^5 = \cos t$

   (b) $(\tan x)\ y^{(4)} + (1-e^x)y = cos(x)$

   (c) $\frac{d^2u}{dr^2} + sin(u)\ r\ \frac{du}{dr} = r$

   (d) $(y')^2 = \tan y$

2. Solve the differential equation

   $$ty' + y - t^4 \ln t = 0$$

   and find its interval of solution.

3. Does the IVP $y' = t\tan^{-1}(y),\ y(0) = 2$ have a unique solution?

4. Solve the IVP $\dfrac{dy}{dx} = -2y + f(x), \quad y(0) = 3,$ where $f(x) = \begin{cases} 0 & \text{if} \quad x < 1 \\ 5 & \text{if} \quad x \geq 1 \end{cases}$