Worksheet #7
Date : 13/03/2024 **Name:** _____
MTH204: ODEs/PDEs
Semester: Winter 2024 **Section:** _____

Problem 1. Determine the location, classification and stability of all critical points of sytem of ODEs:

$$\begin{aligned} y_1' &= y_2 \\ y_2' &= -y_1 + \frac{1}{2}y_1^2. \end{aligned}$$

Problem 2. Find a general solution of the following system using variation of parameters:

$$\begin{aligned} y_1' &= y_2 + e^{3t} \\ y_2' &= y_1 - 3e^{3t}. \end{aligned}$$

Problem 3. Find a general solution of the following system using method of undetermined coefficients:

$$\begin{aligned} y_1' &= 4y_1 + y_2 + 0.6t \\ y_2' &= 2y_1 + 3y_2 - 2.5t. \end{aligned}$$

Problem 4. Find the location and type of all critical points by first converting the ODE to a system and then linearizing it:

$$y'' - 9y + y^3 = 0.$$