Quiz-1
Math 537 Ordinary Differential Equations
Due 9:00AM Wednesday, August 26, 2020

Student Name: _____ **ID** _____

Goal: The following problems are selected to help students review fundamental ordinary differential equations.
Total points: 35

1: [10 points] Consider the following **first-order** ODEs:

(a) Separable ODEs;

(b) Linear ODEs;

(c) Exact ODEs;

(d) Bernoulli Equations.

Please provide one example for each of the above ODEs and discuss the corresponding solutions.

2: [10 points] Consider the following homogeneous linear 2nd-order ODEs with constant coefficients:

$$y'' + ay' + by = 0, \tag{2}$$

where a and b are constant. Please discuss three types of solutions based on the so-called characteristic equation.

3: [10 points] Consider the following Euler-Cauchy equation:

$$x^2y'' + axy' + by = 0, \tag{3}$$

where a and b are constant.

(a) Please discuss three types of solutions.

(b) Introduce a new independent variable $(t), x = e^t$, to convert the above Euler-Cauchy equation into a second-order ODE with constant coefficients (i.e., in the form of Eq. 2).

4: [5 points] Provide a brief summary on what has been completed in this assignment.