King Fahd University Of Petroleum and Minerals
College of Sciences
Mathematics and Statistics Department
Math 202-12
Quiz#3-1

Name:..... ID#:..... Serial#:.....

1. Determine the singular points of the differential equation
   $x^3 (x-5)(x-2) y'' + 3x^2 (x-2) y' + y = 0.$
   Classify each singular point as regular or irregular.

2. $x = 0$ is a regular singular point of the differential equation
   $x^2 y'' + \left(\frac{5}{3}x + x^2\right) y' + -\frac{1}{3} y = 0.$
   Find the roots of the indical equation

3. Find two power series solutions of the differential equation $y'' - xy = 0$ about the ordinary point $x = 0$.

4. Consider the following differential equation
   $3xy'' + 2y' - y = 0$

   (a) Find the indical equation and its roots
   (b) Find the power series solution associated to the largest indical root