King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
Math 202 (153) Sec - Quiz 4

Name: ID: Serial No.:

1. Find the recurrence relation for the coefficients of power series solutions of $y'' + 2xy' + 2y = 0$ about the ordinary point $x = 0$.

2. By substituting $y = \sum_{n=0}^{\infty} c_n x^n$ in a differential equation, we obtain

$$2c_2 - c_0 + 6c_3 x + \sum_{k=2}^{\infty} [(k+1)(k-1)c_k - (k+2)(k+1)c_{k+2}]x^k = 0, \quad \text{for all } x.$$

Find the general solution of that differential equation.

3. Consider the following differential equation

$$x^2 y'' - xy' + \frac{5}{4}(x-1)y = 0.$$

(a) Find the indicial equation roots.

(b) Let $y_1 = \sum_{n\geq 0} c_n x^{n+r_1}$, with $c_0 = 1$ power series solution corresponding to be the the largest root of the indicial equation. Find the value of $c_1 + c_2$.