

King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics

Math 202 **Section#:** **Serial #:** **Quiz 4(a) (Term 182)**

Name : **ID #**..... **Marks**/7

1. The differential equation $2xy'' - y' + 2y = 0$ has a regular singular point at $x = 0$.
 - (a) Find roots of the indicial equation about $x = 0$ for this differential equation.

(b) Use nature of these roots to guess expected number of Frobenius series solution of this DE.

(c) Find first three nonzero terms of the series solution of this differential equation which correspond to the smaller indicial root.

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1. Verify that $y = \sum_{n=1}^{\infty} (-1)^{n+1} x^n$ is a series solution of the DE $(x + 1)y'' + y' = 0$.

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1. Find a recurrence relation to find power series solutions of the differential equation $y'' - 2xy' - 4y = 0$ about the ordinary point $x = 0$.
(Do not find the solutions).

2. Classify singular points as regular or irregular for the differential equation $2x(x - 2)^2y'' + 3xy' + (x - 2)y = 0$