King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
Math 202 (153) Sec - Quiz 3

Name: ID: Serial No.:

1. Determine whether the set of functions

$$f_1(x) = 2\sqrt{x} + 3,\ f_2(x) = \sqrt{x} + 2x,\ f_3(x) = 4x - 3, f_4(x) = x^2 + 1$$

is linearly independent on the interval $(0, \infty)$.

2. Without solving the differential equation, verify that $y = c_1 x^{-1} + c_2 x - \ln x$ is the general solution of $x^2 y'' + xy' - y = \ln x,\ x > 0$.

3. Given that $y_1 = x$ is a solution of the differenital equation

$$(1-x)^2 y'' + 2xy - 2y = 0 \quad \text{on } (-1, 1),$$

find a second solution $y_2(x)$ that is linearly independent of y_1.

4. Solve the BVP: $y'' - 2y' + 2y = 0, \quad y(0) = 1,\ y(\pi) = 1$