NDU

MAT 235

Ordinary Differential Equations

Exam # 2

Duration: 60 minutes

Name: _____

Section: A

Instructor: Dr. Ishac Zoghbi

Grade: _____

1) **(15 points)** Solve the differential equation $xy'' + y' = x^3 + x$ for $x > 0$.

2) **(18 points)** Solve $y''' + 3y'' - 4y = 18e^{x} + 16e^{2x}$.

3) **(24 points)** Solve the initial-value problem

$x^2 y'' - 6xy' + 10y = 4x^3$ for $x > 0$ with $y(1) = 0$ and $y'(1) = 1$.

4) **(18 points)** Find the general solution of the differential equation $(x-1)y'' - (x+1)y' + 2y = 0$ for $x > 1$ given that $y_1 = e^x$ is a particular solution.

5) **(25 points)** Find a general power series solution for the differential equation $y'' - xy' - xy = 0$ near the point $x_0 = 0$.