

NDU

MAT 235

Ordinary Differential Equations

Exam # 2

Duration: 55 minutes

Name: _____

Section: _____

Instructor: _____

Grade: _____

1) (20 points) Solve the following differential equation for $x > 0$:

$$y'' - \frac{2}{x}y' + \frac{2}{x^2}y = x \sin x$$

- 2) (15 points)** Find the general solution of the differential equation $(x^2 - 1)y'' - 2xy' + 2y = 0$ ($x > 1$) given that x is a particular solution.

3) (20 points) Solve the initial-value-problem $yy'' = (y')^2$ with $y(0) = y'(0) = 1$.

4) (20 points) Solve the differential equation $y'' = xe^x + y$.

5) (25 points) Find a general power series solution for the differential equation $y'' + xy' + 2y = 0$ near the ordinary point $x_0 = 0$.

Bonus Problem (10 points) Refer to exercise (5). Find a particular solution for $y'' + xy' + 2y = x$ near $x_0 = 0$ and deduce the general solution.