

**NDU**

**MAT 235**

**Ordinary Differential Equations**

**Exam # 2**

**Duration: 55 minutes**

**Name:** \_\_\_\_\_

**Section:** \_\_\_\_\_

**Instructor:** \_\_\_\_\_

**Grade:** \_\_\_\_\_

**1) (25 points)** Find the general solution of  $x^2y'' + 7xy' + 5y = x$ .

**2) (20 points)** Find the general solution of  $y'' + 6y' + 9y = x^{-3}e^{-3x}$ .

- 3) (20 points)** The point  $x = 0$  is an ordinary point of the equation  $(x^2 - 1)y'' - 2xy' + 2y = 0$ . Use this fact to find the general solution of the given equation.

**4) (35 points)** Use the Frobenius method to find the power series solution in power of  $x$  to the equation  $x^2 y'' - 2x^2 y' + \left(x^2 + \frac{1}{4}\right)y = 0$ .

