

**NDU**

**MAT 235**

**Ordinary Differential Equations**

**Exam # 2**

**Duration: 55 minutes**

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

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

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

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

**1) (20 points)** Solve the following initial value problem  $xy'' - y' = x^2e^x$  with  $y(1) = 1$  and  $y'(1) = e$  for  $x > 0$ .

**2) (20 points)** Solve  $x^3y'' + xy' - y = 1$  for  $x > 0$ , given that  $y_1 = x$  is a particular solution for  $x^3y'' + xy' - y = 0$ .

- 3) (30 points)** Solve  $y'' - 2y' + y = e^x$  using  
a) the method of variation of parameters

b) the method of undetermined coefficients.

**4) (30 points)** Find the general power series solution for  $y'' - xy' - y = 0$ .

