**MATH 220**
**1st Hour Exam**
**September 26, 2008**

Name:
Section time:

1. Use Euler's method with $h = 1$ in order to approximate the solution to the initial value problem:

$$y' = y^2 + x^2, \quad y(0) = 0$$

at $x = 3$. (15pts)

2. Find the general solution of the differential equation:
$(2y^3 + 3xy)dx + (3xy^2 + x^2)dy = 0$ (15pts)

3. Find the general solution of the differential equation:
$(xy^2 + x)dx - (yx^2 + y)dy = 0$ (15pts)

4. Solve the initial value problem:
$x^2 \dfrac{dy}{dx} + 2xy = \ln x, \quad y(1) = 2$ (20pts)

5. Solve the initial value problem:
$y'' - 6y' + 9y = 0, \quad y(0) = 1, \quad y'(0) = 3$ (20pts)

6. Find the general solution of the differential equation:
$y'' + y' + y = 0$ (15pts)