MATHEMATICS 202
SUMMER SEMESTER 1999-2000
MAKEUP QUIZ I

Date: JULY 21, 2000
Time: 55 MINUTES

Answer the following five questions:

1. Solve the initial-value problem

$$\frac{dy}{dx} = 2 + \sqrt{y - 2x + 3}, \; y(0) = 1.$$

(10 points)

2. Solve the differential equation

$$y(\ln x - \ln y)dx = (x\ln x - x\ln y - y)dy.$$

(10 points)

3. Solve the initial-value problem

$$x\frac{dy}{dx} + 4y = x^4 y^2, \; y(1) = 1.$$

(10 points)

4. Solve the differential equation

$$(2y^2 + 3x)dx + 2xydy = 0,$$

knowing that its integrating factor is of the form $\mu(x,y) = x^m y^n$ for some reals m and n. (10 points)

5. Explain why the diferential equation

$$(y')^2 = \frac{4 - y^2}{4 - x^2}$$

possess no real solutions for $|x| < 2$, $|y| > 2$. Are there other regions in the xy-plane for which the equation has no solutions? (10 points)