American University of Beirut MATH 202 Differential Equations Spring 2007

quiz # 1

Name:

ID #:

1. Find the general (implicit) solution of the differential equation

$$x^3 e^y y' = 1 + e^{2y}$$

2. Find the general (implicit) solution of equation

$$y' = \frac{y^4 + x^2y^2 - x^4}{xy^3}$$

- **3.** Find the general solution of the equation $y'' 6y' + 10y = e^x + 5x$
- 4. Find the general solution of $xy' y = \frac{9}{x-3}$
- 5. Solve the IVP

$$y''' + 8y'' + 20y' + 16y = 0$$
, $y(0) = 0$, $y'(0) = 0$, $y''(0) = 4$

6. Find the (implicit) solution of the IVP

$$2xydx + (2x^2 + \sin y)dy = 0 , \quad y(0) = \pi$$

7. Given that $y_1 = e^{-2x}$ is a solution of the following equation, find the general solution

$$xy'' + (2x - 1)y' - 2y = 0$$

The solution you found above is defined and continuous for all x, but the equation seems to have a bad point at x = 0. what exactly is the problem at x = 0?

- 8. Find the outward flux of the field $F = 2xy\mathbf{i} + x^2\mathbf{j}$ across the curve C in the first quadrant, bounded by the parabola $y = x^2$ and the line y = 1.
 - **i.** by using the line integral
 - ii. by using Green's theorem