# American University of Beirut <br> MATH 202 

Differential Equations
Spring 2007
quiz \# 1
Name: $\qquad$ ID \#:

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

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

2. Find the general (implicit) solution of equation

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

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

$$
y^{\prime \prime \prime}+8 y^{\prime \prime}+20 y^{\prime}+16 y=0, \quad y(0)=0, \quad y^{\prime}(0)=0, \quad y^{\prime \prime}(0)=4
$$

6. Find the (implicit) solution of the IVP

$$
2 x y d x+\left(2 x^{2}+\sin y\right) d y=0, \quad y(0)=\pi
$$

7. Given that $y_{1}=e^{-2 x}$ is a solution of the following equation, find the general solution

$$
x y^{\prime \prime}+(2 x-1) y^{\prime}-2 y=0
$$

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 $F=2 x y \mathbf{i}+x^{2} \mathbf{j}$ 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

