Directions: Use only **ONE** side of each page; Be neat; Leave margins on the left and top for the **STAPLE**; Nothing written on this page will be graded;

1. Define these terms:
   (a) differential equation
   (b) mathematical model
   (c) direction or slope field
   (d) equilibrium solution
   (e) rate function
   (f) integral curves
2. Define these terms if the term is a contrast, give examples of both. (Perhaps among the equations of the next problem.)
   (a) initial value problem vs boundary value problem
   (b) ordinary DE's vs partial DE's
   (c) solution vs general solution
   (d) linear vs nonlinear
   (e) systems vs single equation
   (f) order
3. For each of the problems below fill out a line in a table line the one started below. (Careful, some of these are tricky.)

Eqn	PDE/ODE	linear?	system?	order	IVP/BVP
?	?	?	?	?	?

   (a) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0, \quad u(x,y) = 0$ if $x^2 + y^2 = 25$
   (b) $y' = 2y, \quad y(0) = 5$
   (c) $y' = (x^2 + \sqrt{x})y, \quad y(0) = 5$
   (d) $y' = y^2, \quad y(0) = 5$
   (e) $\frac{\partial z}{\partial y} = y^2, \quad z(0) = 5$
   (f) $w'' - w = \sin(t), \quad w(0) = 5, w'(0) = 2, w''(0) = 5$
   (g) $\xi'' - \xi = \sin(t), \quad \xi(3) = 5, \xi'(3) = 3$
   (h) $\psi'' - \psi = \sin(\tau), \quad \psi(0) = 5, \psi(5) = 3$
   (i) $y'' - x = \sin(t), x' = y, \quad y(0) = y'(0) = x(0) = x'(0) = 0$
   (j) $x^5 y^3 - x^2 + \sqrt{xy} - \omega = 0, \quad x^2 + y^2 = 25$