MTH204
Quiz 1
29 August 2008

Name Key
Section A\C

Follow the directions carefully. Please show all your work neatly in pencil. This quiz is closed notes, closed book, but you may use your homework solutions. If you get stuck, feel free to ask me for help.

LEAD - Thursdays
CSF G5D
5:00 - 7:00 PM

1. Find the order of each DE. Determine whether each DE is linear or nonlinear. If nonlinear, state why.

(a). $2x^2y'' + 5y = \sin(x)$

2nd order, linear

(b). $\frac{d^2y}{dx^2} = \frac{y(2-3x)}{x(1-3y)}$

2nd order, nonlinear - y is the denominator

(c). $\frac{d^5x}{dt^5} + (t-1)\left(\frac{d^2x}{dt^2}\right)^3 = t^2$

5th order, nonlinear - power of $x'' \neq 1$

(d). $\frac{dA}{dt} = 10 - \frac{4A}{100-t}$

1st order, linear

(e). $\frac{dP}{dt} = P(a-bP)$

1st order, nonlinear - coefficient depends on P.

2. Given $y' = \sqrt{x+y}$, determine a region in the xy-plane such that the DE would have a unique solution through $(x_0, y_0)$. Sketch the region.

$y' = f(x,y) = \sqrt{x+y}$

$\frac{\partial f}{\partial y} = \frac{1}{2\sqrt{x+y}}$, $x+y > 0$

$R = \{(x,y): y > -x\}$