ECON 5233 – Cary Deck Name _____________

Exam 2 – 2009 Score _____________

You must complete 60 points worth of questions. This means that you must answer the first question and four of the last five questions. Place an X beside the questions you want graded.

_X_Q1. (20 points) Calculate the following. A=$\begin{bmatrix} 3 & -1 & 2 \\ 1 & 0 & 1 \\ 2 & 1 & 0 \end{bmatrix}$, B=$\begin{bmatrix} 2 & -1 & 1 \end{bmatrix}$, C= $\begin{bmatrix} 2 & 4 \\ 0 & x \end{bmatrix}$

a. A^{-1}
b. AB^T
c. $(AB)^T$
d. $\frac{d\, ln|C|}{dx}$
e. $\frac{d}{dx}(x^{1/4}+2x)^3\ln(x^{-1})$
f. $\frac{d}{dy}\frac{d}{dx}\frac{\ln x}{x^3}(x^3+2)+x^2y^2+2y$
g. $\int(x^3+2x)^7\,(3x^2+2)dx$
h. $\iiint_R \frac{1}{x}+y^2+yx\,dV$ where R is defined by $x\in[e,e^2], y\in[0,x], z\in[0,1]$
i. X_t as a function of t if $X_t = -4X_{t-1}-3X_{t-2}+8$, $X_0=6$, and $X_1 = -8$.
j. The steady states of $X_t = (2X_{t-1})^2 + X_{t-2}-16$.

___Q2. (10 points) Find the steady state of the following system of linear difference equations by diagonalizing the system. Determine if the original system will converge to the steady state and plot a phase diagram for each of the series in the diagonalized system.

$X_t=.5X_{t-1}-.3Y_{t-1}+.2$
$Y_t=.4X_{t-1}-.2Y_{t-1}-.2$

___Q3. (10 points) The joint pdf for x and y is pdf(x,y)= $\begin{cases} 10x^2y & if\ 0\le y\le x\le 1 \\ 0 & otherwise \end{cases}$
Find the E(z) where z = x + y. Find the marginal distribution of x. Find the conditional distribution of y given that x = .5.

___Q4. (10 points) Maximize u = x^2y subject to $P_xx+P_yy = \mathrm{I}$ and check the second order conditions. Find the effect of a change in P_x on the optimal value of x by using implicit differentiation on the first order conditions and using Cramer's rule to express dx/dP_x. It is sufficient to express your answer as the ration of two determinants.

___Q5. (10 points) Minimize x^2+y^2 subject to $x\le 8$, $y\ge 20-x$ and $y\le x+16$.

___Q6. (10 points) Determine if the following are weakly concave and/or weakly convex. You must explain your answer to receive credit.

a. $2x^3+y^3+.5z^3+zy+xz$ at (1,1,2).
b. f(x)=$\begin{cases} x & if\ x\le 0 \\ x^2 & if\ x>0 \end{cases}$ over [-∞ , ∞]