Please staple your homework.

*HW is due on **Feb 2**nd @9:30am*

Prof. Evgeniya Duzhak

Name_____ ECO 141

Student ID_____ Spring 2016

Homework 1

(44 points for MyLab) **1.** Let A,B,C be annual returns on Apple INC, Euro Bonds, and CityGroup INC stocks respectively. You are given a table on MyLab that describes the probability distributions for these stock returns based on the state of the economy.
Please use answers rounded to third decimal. (example 0.8634 = 0.863; 0.0328 = 0.033)
One of the questions asks you to compute the expected value, variance, standard deviation for each stock.
Comment on the results for **each** stock below:

(28 points) **2.** Does the performance of the US economy depend on the party affiliation of the US President? To investigate this question further, you collect and study quarterly data on real GDP and President's affiliation from 1943 to 2015.The file hw1.csv, posted on Bcourses, includes variables *RGDP* and variable *Dpresident* which is a dummy indicator of whether the President is a member of Democratic Party (=1 if he is, =0 if he is Republican). You are free to use the software of your choice to answer the following questions. However we strongly encourage you to use STATA for this exercise. Please *attach* all relevant *printouts*.

(a) Generate a variable for the growth rate of real GDP. What was the average **annual** growth rate over the entire period?

(b) Find the average annual growth under the Democrat Presidents and under the Republican Presidents. What is the difference in the growth rate between the two parties? Would you consider it large?

(c) Are the standard deviations significantly different between Democratic and Republican Presidents? Interpret the result.

(22 points) **3.** Gap is a clothes retailer that among many things produces T-shirts and faces a demand represented by the function $Q = 100 - 2P + 0.5T$, where Q denotes the quantity demanded, P is the unit price, and T is a random variable that captures consumer's tastes with mean $\mu_T = 2$ and variance $\sigma^2_T = 9$.

The firm's total costs (TC) are given by the sum of fixed (FC) and variable costs (VC). Specifically, $TC = FC + VC = FC + AVC * Q$, where AVC denotes average variable cost. Suppose that $P = 10$, $FC = 20$, and $AVC = 2$.

(3 p) (a) List all the random variables in the firm's problem.

(6 p) (b) Compute the mean and variance of the firm's sales ($P*Q$).

E[$P*Q$]

Var[$P*Q$]

(6 p) (c) Compute the mean and variance of the firm's total costs.

E[TC]

Var[TC]

(3 p) (d) What is the value of the covariance between sales and totals costs?

$Cov[PQ, TC]$ =

(4 p) (e) Are sales and tastes positively or negatively correlated in this model? Is the correlation perfect? Explain briefly.

(6 points) 4. Derive the following formula from a general definition of variance.

$$Var(X) = E(X^2) - E(X)^2$$