**Round only at the 4th digit after the decimal point**. Show your work.

* 1. What is the main difference between time series observations and cross sectional observations?
  2. What is covariance stationarity of a time series?
  3. What is mean stationarity? Do the following time series seem to be mean stationary? Justify your answer?   
     1. Apple stock price for January 2001 to August 2016:



* + 1. log(Apple Stock Pricet) – log(Apple Stock Pricet-1):



* + 1. Percentage Change in CPI:  
       
  1. What is the economic meaning of the series:  
       
     log(Apple Stock Pricet ) – log(Apple Stock Pricet-1 ) ? What is it commonly called?
  2. What is the term in economics for the variable measured in (iii)?

2. Consider the following model:  
  
*Yt = 0.7 - 0.5 εt-1 + 0.7 εt-2 + εt*

where *εt* is normally distributed white noise with zero mean and variance *0.04*.

1. *Derive h*-period ahead optimal forecasts and corresponding forecast intervals (90%) of *Yt* for *h=1, 2, 3*, and *4*. Your information set contains information up to period *t*. Assume that   
   *εt = 0.5, εt-1* = *- 0.1, εt-2* = *- 0.2, εt-3* = *0.7,* and *εt-4* = *0.3*
2. *Derive* the unconditional mean and variance of the *Yt* process. How do your point forecasts and forecast variances in a. above compare with these unconditional mean and variance?