Problem 1 Identify the following as specific ARIMA models. Give p, d, q and θ and ϕ. (a) $Y_t = Y_{t-1} - 0.25Y_{t-2} + \epsilon_t - 0.1\epsilon_{t-1}$
(b) $Y_t = 2Y_{t-1} - Y_{t-2} + \epsilon_t$
(c) $Y_t = 0.5Y_{t-1} - 0.5Y_{t-2} + \epsilon_t - 0.5\epsilon_{t-1} + 0.25\epsilon_{t-2}$

Problem 2: For each of the ARIMA models below, give the values of $E(\nabla Y_t)$ and $\text{Var}(\nabla Y_t)$.
(a) $Y_t = 3 + Y_{t-1} + \epsilon_t - 0.75\epsilon_{t-1}$
(b) $Y_t = 10 + 1.25Y_{t-1} - 0.25Y_{t-2} + \epsilon_t - 0.1\epsilon_{t-1}$
(c) $Y_t = 5 + 2Y_{t-1} - 1.7Y_{t-2} + 0.7Y_{t-3} + \epsilon_t - 0.5\epsilon_{t-1} + 0.25\epsilon_{t-2}$

Problem 3:
The following data sets were used in Homework 3. Back then, you have identified what you believe to be the best model. Based on more background you have now on Time Series such as Model transformation based on residuals errors, do you reconsider your candidate model in each case? Revisit your work based on what you know now and see if your model can be improved. look at the residuals and see which transformation is best for the data.

`ibm`: daily IBM stock closing prices
`internet`: number of users log on to an internet server each minute
`gasprices`: average price (US dollars per gallons) for regular gasoline in the US. There are $n = 145$ weekly observations collected from 1/5/2009 to 10/10/2011.

Do the following in the textbook:
6.1 Page 191.