

**STA457H1: Time Series Analysis**  
**Assignment 3 - Question 8** **Due data December 2, 2022**

Student Name.....ID number.....

**Instructions:** *Show your answers in details.*

**Q8 (8 points):** Let  $x_t$  be a time series of 11 values

1, 1, 3, -1, 0, 4, 2, 0, -2, 1, 2

1. Use the Yule-Walker equations to estimate the parameters of AR(2) model.
2. Construct the 95% confidence interval around the parameter  $\phi_1$ .
3. Calculate the first three sample partial autocorrelations.
4. Calculate the residuals of the fitted model in part (1).
5. Use Durbin-Watson test to check for first-order autoregressive errors.
6. Test whether there is a unit root versus the alternative that the process is stationary.
7. Apply the Ljung-Box portmanteau test on the residuals of the fitted AR(2) model at lag  $m = 3$ . What you can conclude?
8. Redo parts (1)-(7) using R and confirm you get similar results!