MATH 271.2 E, F **DUE: 10 Jun 2024**
Problem Set #1 **J. Briones**

General Instructions: *Show all pertinent and relevant solutions. Answers do not magically appear in papers. So do not give them without solutions or explanations. Submit your problem set (as* `.pdf` *file) and codes (as* `.R` *or* `.Rmd` *file) via* `Canvas` *on or before June 10, 2024, 23:59. GOODLUCK!*

1. Let S_t be the sales at time t for the gadget `IG-11`, with the data in `Item2.csv`. Using $X_t = \ln S_t$, do the following in `R`. **[25pts]**

   (a) Is the data stationary? Use appropriate test(s) to justify your answer. If the data is not stationary, perform the necessary transformation to make the data stationary. Verify that the transformed data is indeed stationary.

   (b) Let Y_t be the transformed data in (a). Is there serial correlation? Use appropriate test(s) to justify your answer.

   (c) Generate correlograms of the ACF and PACF of the transformed data Y_t, and use these to identify one possible AR(p), one MA(q), and one ARMA(p, q) model, where p and q are both less than or equal to 5. Justify your choices.

   (d) For each of these models, write down the resulting models in functional form.

   (e) Given only the three models in (c), which should you choose? Explain.