AGEC 317
Spring 2020
Problem Set 1

Put your work for this assignment in a new Word document and submit via eCampus by **January 27ᵗʰ, 2020 at 11:59PM**. *This assignment is worth 5 points. No late work will be accepted.*

This problem set refers to data from "PS1_Hamburger.xlsx" found on eCampus.

You are a new analyst with 12ᵗʰ Man Consulting, and a local butcher – Aggieland Butcher Shop – has approached you with a problem. Aggieland Butcher Shop (ABS) primarily produces hamburger patties to sell to local restaurants and eateries. ABS wants to purchase a new hamburger patty machine, but doesn't know which machine to buy:

- Patty-O-Matic 330A, which costs $7,995
- Gesame MH-100 Food Former, which costs $9,900

Each machine produces hamburger patties that are 4oz on average, but there is some variability; because the meat is sticky, sometimes the patties are a little over or a little under 4oz. If the produced patty is over 3.99oz, that's fine. However, if the produced patty is *under* 3.99oz, local restaurants won't buy it, so the small patty is scrapped, and the meat is put back into the machine at a small cost.

Aggieland Butcher Shop wants your professional recommendation on which machine to purchase.

1. Columns E, F, and G show 100 observations of the size of patties produced by each machine. Calculate the mean, median, and standard deviation of patty sizes for each machine (random variable) and put your answers in a well-formatted table.

2. Test the equality of variance for produced patties from the machines. Provide your null and alternative hypotheses, and all results from your test. Are the variances equal? (*Hint: you should use an F-test*)

3. Test the equality of the sample mean patty size for each machine, using a two-sample, two-tailed t-test. Provide your null and alternative hypothesis, and all results from your test. Is the average patty size equal across both machines? (*Hint: the t-test is two-sample, but be sure to use the results from (2) to decide whether to assume equal or unequal variances*)

4. Using the observed data, what is the daily profit of each machine? How many days will it take to break-even for each machine? Which machine do you recommend to Aggieland Butcher Shop?

5. Suppose the Patty-O-Matic 330A gets an upgrade that decreases the cost of re-using under-sized patties from $0.25 to $0.11, though the price-tag increases from $7,995 to $8,100. How do these changes affect your recommendation?