**Assignment #1**

**Due:** Wednesday **January 19**, 2022 by 5 PM ET

Guidelines for your submission:

* Your responses must be submitted as a single **PDF (Portable Document Format)** file.
* Include your name at the top.
* Please copy and paste any R (or similar) output or graphics that you create into your assignment document. All responses must be easy to read and labeled with the appropriate problem number.
* Please save your work regularly (both your work in R and the solutions to the lab questions).
* Submit the **.pdf file** with your responses via **Canvas**.

**Part 1: Introductions**

Please provide brief responses to each of the questions below. I am asking these questions so that I get to know a bit more about your background and reasons for taking Regression. This will help me prepare the materials for this semester’s course to best meet your needs. You will receive full credit if each question is answered.

1. What is your academic program?
2. When did you last take a statistics course? What was the course? Was it the highest level statistics course that you have taken (if not, tell me more about the highest-level course)?
3. When did you last take a mathematics course? What was the course? Was it the highest level mathematics course that you have taken (if not, tell me more about the highest-level course)?
4. What are goals after completing your academic program?
5. Tell me something interesting that you have done during the last year (this does not have to be anything related to why you are taking this regression class).

**Part 2: More with PDFs (Probability Density Functions):**

**The distribution**

**Instructions:** You will need R for this part.

Also, keep in mind that in working with R (or R studio) that:

* There is often more than one way to achieve the same task (e.g., I will provide some instructions for creating plots, but it is also possible to get the same plots with a special package, such as ggplot2). If you have previous experience with R, feel free to use different code to achieve the required result.
* It is always helpful to start an R session with **library(tidyverse)**.

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In Lab 1, we considered a *t*-distribution. Now we are going to consider an distribution. We will discuss more specifics about this distribution when we review tests. Below I provide what you need to know for now.

The density function for a random variable that follows an distribution is a ratio of two () distributions. Thus, it is based on two parameters-one being the degrees of freedom for the numerator () and the other being for the denominator ().

We will use *similar* functions to those used in Part 1 of Lab 1 but now we are working with the distribution rather than (use your work in Lab 1 for guidance). Type **?df** into R to see more specifics about working with . In considering percentiles and probabilities for the distribution, I suggest sketching the density curve by hand and then shading the appropriate area. These sketches do not need to be included in your submission but will be helpful in answering the questions.

Consider a random variable that follows the distribution with and =5. Here .

1. Plot the density curve. Keep in mind that the values of the random variable here must be positive. Make sure that the *x*-axis represents ***F*** values between **0** and **7** and the *y*-axis is labeled “**density**.”
2. Find the median value of . (Hint: keep in mind which percentile the median corresponds to.) Report your answer as , filling in values for and .
3. 4% of values will fall above which value of ? Report your as .
4. Find .
5. Find .