Probability and Distributions

AGRON 5130

YOUR NAME HERE

Introduction

The goal of this assignment is to give you hands-on practice working with probability, probability distributions, and the normal distribution in R. You will work with both simulated data and spatial yield data to estimate probabilities, visualize distributions, and connect summary statistics to probabilistic statements. Submit a knitted PDF/HTML generated from your R Markdown file to Canvas.

Question 1

1 point

Load the `peanut_uniformity` dataset and assign it to an object called `peanut`.

note: this might be a good place to include a code chunk loading the `fastGraph` library

Question 2

1 point

Inspect the dataset using the `head()` function.

Question 3

1 point

Create a histogram of yield using the `hist()` function.

Question 4

2 points

Calculate the mean yield and assign it to the variable `peanut_mu`. Calculate the standard deviation of yield and assign it to the variable `peanut_sigma`.

Question 5

2 points

Plot the normal distribution for the peanut yield data and calculate the probability of observing a yield less than 1.5.

Question 6

1 point

Calculate the probability of observing a yield greater than 3.5.

Question 7

1 point

Calculate the probability of observing a yield greater than or equal to 1.6 and less than 2.9.

Question 8

1 point

Load the shapefile `"data/merriweather_yield_map/merriweather_yield_map.shp"` using `st_read()` and assign it to an object called `soybean`.

note: Hear that? It sounds like there's someone saying "Load the sf package!"

Question 9

1 point

Inspect the `soybean` data using the `head()` function.

Question 10

2 points

Plot a yield map using the `"yield_bu"` column of the `soybean` dataset and create a histogram of yield.

Question 11

2 points

Calculate the mean yield and assign it to the variable `soybean_mu`. Calculate the standard deviation of yield and assign it to the variable `soybean_sigma`.

Question 12

1 point

Using the normal distribution, calculate the probability of observing a yield greater than or equal to 90 bu/ac.

Question 13

1 point

Using the normal distribution, calculate the probability of observing a yield between 75 and 85 bu/ac.

Question 14

1 point

If the probability of observing a yield less than 65.8 bu/ac is 5%, about how many observations out of 100 would you expect to be less than or equal to 65.8 bu/ac?

Write your brief interpretation here:

```
(Your answer)
```