MATH205, Fall 2022, Homework 1, Due Friday, Sep 23, 3:30 pm

Instructions

You can submit the homework either in paper or online

- Online: Take pictures of the written (theory) part; submit it (along with the simulation part) through Canvas

- Paper: Print out the result of the simulation part and staple it with the written work; hand it in at the beginning of the lecture on Friday (09/23)

1 Theory

1. Problem 1: Assume we have a dataset $\{x\}$ of N data items $x_1, x_2, \ldots, x_N$. such that
$$mean(\{x\}) = -1, \quad std(\{x\}) = 2$$

   - Compute $mean(\{2x + 3\})$ and $std(\{2x + 3\})$
   - Find a, b such that

$$mean(\{ax + b\}) = 2, \quad std(\{ax + b\}) = 4$$

2. Problem 2: In a population, the correlation coefficient between weight and adiposity is 0.9. The mean weight is 150 lb. The standard deviation in weight is 30 lb. Adiposity is measured on a scale such that the mean is 0.8, and the standard deviation is 0.1.

   (a) Using this information, predict the expected adiposity of a subject whose weight is 170 lb

   (b) Using this information, predict the expected weight of a subject whose adiposity is 0.75

2 Simulations

From subsection "Problems" of Section 2, *simpleR - Using R for Introductory Statistics*:

- Problem 2.2

- Problem 2.3

- Problem 2.6

For each problem, attach the script (.R) containing the commands, and a screen-shot of the result of the script.