

MATH205, Fall 2021
Midterm (Simulations), Section 051L
Wednesday, Oct 27, 2:30 pm

Instructions

Your solution needs to be submitted on Canvas (Assignment “Midterm - Simulations”), including:

- An R script of the work
- Screenshots of the results and the figures

Problem 1 (20pts)

Assume that the joint probability $P(X, Y)$ of X (receive values 1, 2) and Y (receives values 1, 2, 3, 4) is represented by the following table

X \ Y	1	2	3	4
1	0.14	0.32	0.06	0.1
2	0.06	0.18	0.04	0.1

- Simulate a dataset of $n = 5000$ random draws from the distribution $P(Y)$.
- Compute the mean, the median and the standard deviation of the dataset
- Produce a bar plot of the dataset.

Problem 2 (20pts)

In the library MASS, there is a dataset *UScereal* which contains information about popular breakfast cereals.

- Produce a side-by-side bar plot to visualize the relationship between manufacturer (mfr) and shelf
- Visualize the relationship between sodium and sugars

The plots should have clear titles and all axes labeled.