# Data 145: Evidence and Uncertainty

Problem Set 1

Due: January 31, 2026

**Instructions:** Show all your work. You may collaborate with classmates, but you must write up your solutions independently. Clearly cite any sources you use, including classmates, textbooks, and online resources.

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## 1 Problem Title

Let $X_1, X_2, \ldots, X_n$ be i.i.d. random variables with mean $\mu$ and variance $\sigma^2$. Let $\bar{X} = \frac{1}{n}\sum_{i=1}^{n} X_i$.

(a) Show that $\mathbb{E}[\bar{X}] = \mu$.

(b) Show that $\text{Var}(\bar{X}) = \sigma^2/n$.

## 2 Another Problem

This is a placeholder for another problem. Delete this and add your actual problem content.