Math 106: Homework 4

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Due: Monday, October 27, 2025

Instructions for Homework Turn In

1. Answer **all questions thoroughly** and in the order presented.
2. **Show all work clearly** and provide complete reasoning for each step.
3. Ensure handwriting is neat and legible. Unclear work may not be graded.
4. Include **graphs or diagrams** when relevant (hand-drawn is fine if neat).
5. Write all explanations in **complete, grammatically correct sentences**.
6. Write each answer on a separate sheet of paper; this PDF is for reference only.

Problem 1: Measures of Central Tendency — 25 Points

The following data represent the number of hours 12 students studied for a statistics exam:

$$4,\ 7,\ 9,\ 5,\ 6,\ 8,\ 10,\ 9,\ 6,\ 7,\ 8,\ 5$$

(a) Find the **mean** number of study hours.

(b) Find the **median** number of study hours.

(c) Find the **mode(s)** of the data set.

(d) Interpret what each of these measures tells you about the study habits of the students.

Problem 2: Measures of Spread — 25 Points

Using the same data from Problem 1:

$$4,\ 7,\ 9,\ 5,\ 6,\ 8,\ 10,\ 9,\ 6,\ 7,\ 8,\ 5$$

(a) Compute the **variance** and **standard deviation**.

(b) Explain what the standard deviation tells you about this data set.

(c) Discuss how the spread of the data relates to the mean and median.

Problem 3: The Empirical Rule — 25 Points

A certain biology exam had scores that were approximately normally distributed with a mean of 75 and a standard deviation of 8.

(a) According to the **Empirical Rule (68–95–99.7 Rule)**, between what two values do approximately 68% of students' scores fall?

(b) Between what two values do approximately 95% of students' scores fall?

(c) Between what two values do approximately 99.7% of students' scores fall?

(d) If a student scored 91 on the exam, how many standard deviations above the mean is this score? Interpret what this means.

Problem 4: Application Problem — 25 Points

The weekly salaries (in dollars) of 8 employees at a local store are shown below:

$$520,\ 490,\ 510,\ 530,\ 550,\ 480,\ 560,\ 540$$

(a) Compute the mean, median, and standard deviation of the salaries.

(b) Identify any potential outliers and explain your reasoning.

(c) Suppose one employee receives a raise that increases their salary to \$610. Recalculate the mean and discuss how it changes.

(d) Based on your results, discuss which measure of central tendency (mean or median) better represents the "typical" salary for this group.