Equitable Equations: *Bias and variability*

Problem 1

In each of the following cases, identify both the parameter and statistic. Do you think the difference between the two is more likely attributable to bias or variability, or might it be impossible to tell? Briefly explain your choice.

(a) The average SAT math score in 2022 was 521. In a simple random sample of 25 test-takers from that year, the average score was 595.

(b) On a certain day, 150 people reported gas prices at their local gas stations to a tracking website. The mean price was \$5.53/gallon, while the national average was 4.12.

(c) In ten flips of a particular coin, seven were heads

Problem 2

In an opinion poll, researchers asked 200 random customers at Chicago-area McDonalds if they identified as republicans. Of those surveyed, 31% answered "yes."

(a) Identify at least two possible sources of bias in this study.

(b) Suppose the actual percentage of republicans in the Chicago-area was in fact 31%. Does this mean that the study was not biased? Briefly explain.

Problem 3

Why is the following a poor question to ask in order to learn how much people exercise? Suggest better wording.

How much do you exercise most weeks?

Problem 4

Give an example of a statistic with high variability but low bias. Briefly explain your answer.