Problem 1. Suppose CSI will gather student opinion in three surveys to decide whether to build a new parking lot. For each survey, identify the bias and explain.

(a) Survey 1 is a website that all students can access to express their opinion.

(b) Survey 2 asks randomly selected students who enter the bookstore.

(c) Survey 3 asks randomly selected students whether a large grove of trees should be cut down for the new parking lot.

Problem 2. Using the following list of random numbers, choose a simple random sample of five students from a class of 20 students. If you label all students 01 to 20, which five will be chosen? (Do not reuse digits.)

36071087272972407656531260204178127245863609931694376

Problem 3. A random sample of 3000 students who took the SAT found that 750 paid for SAT-prep courses, and 2250 had not.

(a) What is \( \hat{p} \) (as a percent) for this sample?

(b) What is the standard deviation \( \sigma \) (as a percent) for this sample?

(c) Give a 95% confidence interval for the percent of students who pay for SAT-prep.

(d) What is the margin of error (as a percent) for this survey?

(e) Suppose you want a margin of error half as large as in this survey. How many students must you interview?

(f) If you require 99.7% confidence, what is the margin of error?
Problem 4. Two spinners each have three equal regions. Spinner 1 is marked \{1,3,5\}. Spinner 2 is marked \{2,4,6\}. The game is to spin each spinner once, and add up the scores.

(a) What is the sample space of total scores?
(b) Write down the probability model as a chart of probabilities.
(c) What is the probability that your total is even?
(d) What is the probability that your total is not 9?
(e) What is the mean of this probability model?
(f) What is the standard deviation of this probability model?

Problem 5.

(a) How many 4-digit numbers are there?
(b) What is the probability that a randomly selected 4-digit number is a multiple of 5?
(c) A deck of 52 cards has 4 aces. What is the probability you will draw two aces?

Problem 6. The scores of high-school seniors on the NAEP test had a distribution that was approximately normal, with mean \( \mu = 300 \) and standard deviation \( \sigma = 36 \).

(a) What is the probability that a random senior’s score is higher than 300?
(b) What is the probability that a random senior’s score is lower than 336?