**STAT 2 practice exam**

**Question 1:** A survey of a simple random sample of 1000 Americans is carried out. Participants were asked a series of questions about their health and their exercise habits. Of the 400 people in the study who said they exercised regularly, 100 were overweight. Of the other 600, 200 were overweight. From this study alone, can you conclude that exercising reduces one's chance of being overweight?

**Question 2:** Find the SD (not the SD+) of the following set of numbers:

\[100 \quad 200 \quad 300 \quad 500 \quad 1000\]

I study the dimensions of chum salmon at a fishmarket. The lengths of chum salmon are normally distributed with mean 24 inches and SD 6 inches. The girths of chum salmon are normally distributed with mean 16 inches and SD 4 inches. The scatterplot of chum salmon length and girth in inches is football-shaped; the correlation is 0.8.

**Question 3:** 1 inch is 2.54 cm. What is the correlation between the length of chum salmon in cm and the girth of chum salmon in cm?

**Question 4:** What is the probability a randomly selected chum salmon is more than 27.5 inches long?

**Question 5:** I randomly select three chum salmon from the fishmarket. What is the probability that all three are more than 27.5 inches long?

**Question 6:** What is the probability a chum salmon of girth 18 inches is more than 27.5 inches long?

**Question 7:** What is the probability a 27.5-inch long chum salmon has girth of more than 18 inches?

I draw 1000 playing cards from a standard deck of 52 cards with replacement, reshuffling after every card I draw.

**Question 8:** What is the expected number of aces I draw?

**Question 9:** What is the approximate probability I will draw more 85 aces?
**Question 10:** I draw 1000 marbles out of a large box, with replacement. 600 of them are red. What is a 95% confidence interval for the percentage of marbles in the box that are red?

**Question 11:** Berkeley has 35000 students. I take a simple random sample of 300 of them. The sample owns an average of 0.8 bicycles, with an SD of 0.6 bicycles. Find a 92% confidence interval for the total number of bicycles owned by all Berkeley students. (You do not need to use the correction factor.)

**Question 12:** I now wish to carry out a survey to find out the total number of bicycles owned by all Americans. I decide not to take a simple random sample. Why not?

**Question 13:** I make 25 measurements of my sister's height. The measurements average 60.5 inches with an SD of 0.5 inches. Assuming the Gauss model for measurement error, what is a 90% confidence interval for my sister's height?

I believe that a roulette wheel is biased. I spin the wheel 500 times and count the frequency of each number on the wheel.

**Question 14:** What test should I use to determine whether the observed frequencies could be explained by chance?

**Question 15:** My null hypothesis is that each number on the wheel is equally likely. When I do the test, I get a $P$-value of 0.18%. What do I conclude?

**Question 16:** I draw six cards from a shuffled deck, without replacement. What is the probability that exactly two of them are queens?