Problem 1
For each of the following situations, state whether the parameter of interest is a mean ($\mu$) or a proportion ($p$). Also identify the corresponding statistic.
1. In a survey, one hundred college students are asked how many hours per week they spend on the Internet.
2. In a survey, one hundred college students are asked whether or not they cited information from Wikipedia in their papers.
3. In a sample of one hundred recent college graduates, it is found that 85 percent expect to get a job within one year of their graduation date.

Problem 2
4. A sampling distribution is the probability distribution for which one of the following:
   a) A sample
   b) A sample statistic
   c) A population
   d) A population parameter
   e) None of the above

Problem 3
The average number of acres burned by all wildfires in the United States is 780 acres with a standard deviation 500 acres. Of course, some wildfires burn thousands of acres, so the distribution of acres burned by wildfires is strongly right skewed.

5. What is the probability that a random wildfire burns more than 800 acres?

A simple random sample of 200 wildfires is to be taken from this population and the sample mean acres burned calculated. Use this to answer the next two questions.

6. What is the probability to have a sample mean that is higher than 800 acres? Find the closest answer.
   a) 0.391
   b) 0.484
   c) 0.516
   d) 0.286
   e) none of above

7. What is the third quartile (Q3) of the sampling distribution of sample mean acres burned? Find the closest answer.
   a) 1116 acres
   b) 756 acres
   c) 804 acres
   d) 782 acres
   e) 815 acres

Problem 4
The distribution of the number of eggs laid by a certain species of hen during their breeding period is 35 eggs with a standard deviation of 18.2. Suppose a group of researchers randomly
samples 45 hens of this species, counts the number of eggs laid during their breeding period, and records the sample mean.

8. Define the random variable of interest.
9. Which are the parameters of the population distribution of $X$?
10. Which is the shape of the population distribution of $X$?
11. Suppose the researchers take all the possible samples of size 45 and estimate the sample mean for each sample. Which is the name of the distribution that they obtain by plotting all the estimated sample means?
12. Would you expect the shape of this distribution to be symmetric, right skewed, or left skewed? Explain your reasoning.
13. Calculate the variability of the sampling distribution and state the appropriate term used to refer to this value.
14. Suppose the researchers’ budget is reduced and they are only able to collect random samples of 10 hens. The sample mean of the number of eggs is recorded, and we repeat these 1,000 times, and build a new distribution of sample means. How will the variability of this new distribution compare to the variability of the original distribution?

**Problem 5**

15. Suppose that 65% of all college women have been on a diet within the last 6 months. A survey is planned to interview a simple random sample of 100 college women if they were on a diet within the last 6 months. What is the probability that 70% or more of the women in the sample have been on a diet in the last 6 months?  

**Problem 6**

16. The following graph shows two sampling distributions of two sample proportions (Distribution I is taller.) The population from which we sample is the same in both cases. What can we conclude? Hint: Think in terms of the spread.

   a) The sample proportion in I comes from a larger sample from that of II.
   b) The sample proportion in II comes from a larger sample from that of I.
   c) The sample sizes for both sample proportions are equal to each other.
   d) The sample sizes are different, but it cannot be determined which is larger.
   e) Something is wrong. If the population is the same in both cases, the sampling distributions should look the same.

**Problem 7**

17. Historically, 51% voters in a certain state voted for a Republican candidate as state governor. A new governor election is coming up and a survey of randomly selected 100 voters from this state will be conducted, what is the probability that more than 55% will vote for the Republican candidate? Find the closest answer.

   a) 0.83   b) 0.04   c) 0.79   d) 0.96   e) 0.21

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1 Math-UOttawa 2. UVermont 3 Utts 4 OpenIntro