Worksheet – Sections 7.1

Population: the complete set of objects or people under study

Sample: a collection of objects or people drawn from the population

Population parameter: a variable of interest about the population

Sample statistic: a variable measured from the sample used to estimate a population parameter

Simple random sampling: a method of selecting a sample of size n such that every group of size n from the population has an equal chance of being selected.

Sample		*Parameter*	
Sample mean	$\bar{x}$	Population mean	μ
Sample standard deviation	s	Population standard deviation	σ
Sample variance	s^2	Population variance	σ^2
Sample proportion	$\hat{p}$	Population proportion	p

1) A university has 8,500 undergraduate students. The registrar wants to study enrollment in Calculus I. A random sample of 200 students is selected, and 74 of them are enrolled in Calculus I this semester. University records show that 32% of all undergraduate students are enrolled in Calculus I.

(a) What is the population?

(b) What is the sample?

(c) What is the sample size?

(d) Compute the sample proportion of students enrolled in Calculus I.

(e) Identify the population proportion.

(g) Is 74 a statistic, a parameter, or neither?

2) A library contains 12,000 books. The average number of pages per book is 318, with a standard deviation of 52 pages. A librarian randomly selects 200 books and finds an average of 324 pages with a standard deviation of 49 pages.

(a) What is the population?

(b) What is the sample?

(c) Determine the meaning and symbol (if it appears in the above table) of each of the given numbers.

3) A researcher wants a random sample of 20 employees from a company with 100 employees. He/she sends an email asking for volunteers and selects the first 20 people who respond. Explain why this is not a simple random sample.

4) A biologist wants a random sample of 5 trees from a park containing 25 trees. The trees are numbered 1–25. The biologist places the numbers in a box and draws one number at a time. After each draw, the number is returned to the box before the next draw. Is it a good sampling technique?

5) You sample a population of 4 individuals A, B, C, D to see if they have a certain property. Suppose that A and B has this property, while C and D don't.

(a) List all possible samples of size 2 (such as AB, AC, …)

(b) For each of those samples, find the sample proportion $\hat{p}$.

(c) Make a table of probability distribution of $\hat{p}$.

(d) From the table above, use the following formula to find the mean and standard deviation of $\hat{p}$.

Mean = $\sum vP(\hat{p} = v)$ =

Std. dev. = $\sqrt{\sum(v - mean)^2 P(\hat{p} = v)}$ =

6) Repeat Problem 5 but with sample of size 3.