Section A Basic Introduction to Statistics

What do you think of when you see/hear the word *statistics*? The majority of people immediately think of numerical facts, data, graphs and tables. But not only do statisticians collect, classify and tabulate data, they also analyze data in order to make generalizations and decisions.

Why study statistics?

- 1) Everyone comes in contact with statistics in everyday life.
- 2) People should understand reports in newspapers, magazine and journals.
- 3) People should be able to question the statistics they read, and not blindly accept these as proven fact.
- 4) Many areas of study use statistics, such as; psychology, sociology, business, biology, government, engineering, science education and even areas such as history, language and the arts.

<u>Statistics</u> is the science of collecting, organizing, summarizing, and analyzing data to draw conclusions or answer questions. It also provides a measure of confidence in any conclusions.

Two types of statistics:

- 1) <u>Descriptive statistics:</u> the use of numbers to summarize information which is known about some population. [collecting, organizing and summarizing the data]
- 2) <u>Inferential statistics</u>: the use of numbers related to a random sample from a population to give numerical information about the population itself. [analyzing the data to draw conclusions or answer questions about the population]

Probability is very important in inferential statistics; it's related to the risk of making an error.

<u>Variables</u> are characteristics of the individuals or things being studied.

<u>Raw scores or data:</u> Numbers obtained in a particular situation. A collection of raw scores is usually called a distribution of scores.

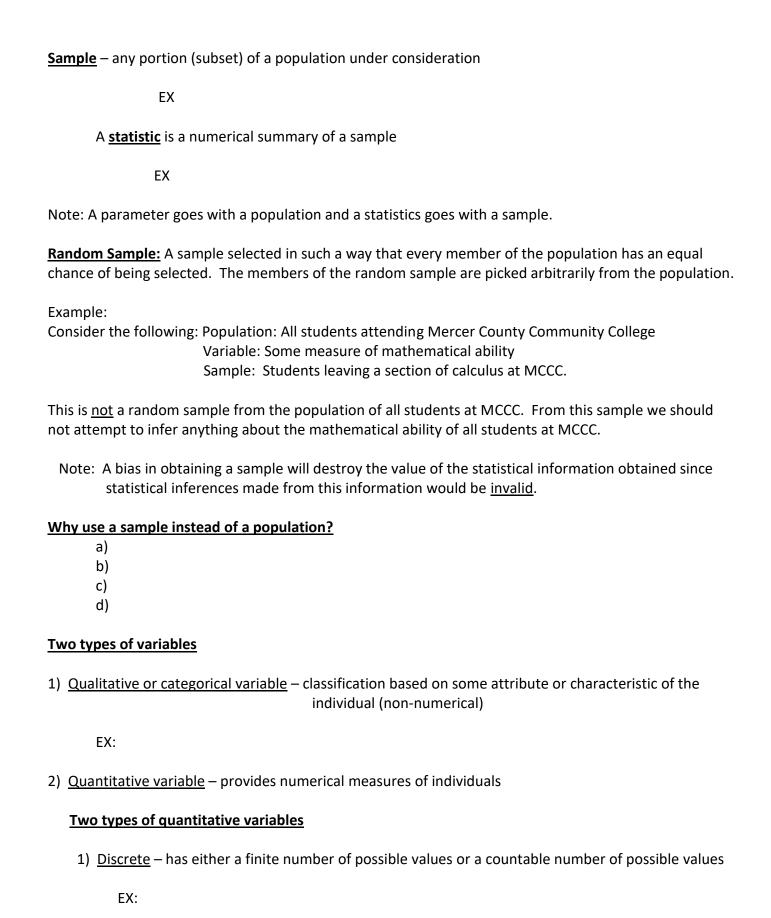
Examples of a distribution:

<u>Population</u> – All people or things being considered in a particular situation

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A **parameter** is a numerical summary of a population.

EX



2) <u>Continuous</u> – has an infinite number of possible values that are not countable

EX:

Examples

- 1) Determine whether the number described is a parameter or statistic:
 - a) In a recent survey of college graduates, 68% of those who responded said they had more than \$50,000 in student loans.
 - b) The average age of the employees working at XYZ Company is 37 years.
 - c) The average GPA of 250 randomly selected students at ABC University is 2.73.
 - d) Of the students attending Mercer County Community College in 2018, 66% were part time students.
- 2) Determine which of the following is an example of descriptive statistics and which is an example of inferential statistics.
 - a) The average weight of all football players on the NY Giants football team is 235 pounds.
 - b) The average yearly salary of a random sample of 150 minor league baseball players is \$102,000. Therefore, the average yearly salary of all minor league baseball players is \$102,000.
- 3) Determine whether or not the sample given represents the given population accurately.
 - a) Population: All students attending Mercer County Community College.

 Sample: 100 students selected at random entering the student center at noon on Monday.
 - b) Population: All businesses in Mercer County.

 Sample: 75 businesses selected at random from a list of all businesses in Mercer County.
- 4) To determine the average GPA of 500 students who just finished their first year in college, a group of 60 students is randomly selected. It is determined that the average GPA is 2.85.
 - a) What is the population for this study?
 - b) What constitutes the sample?
 - c) Based on the sample, what is the statistic for the average GPA of the population?

5) The following data set provides information about five college professors.

Name	Specialty	Gender	Age	Height (in)	# of years of teaching	Rank
Allen	Nursing	F	40	65	16	Associate Professor
Backer	Accounting	M	59	71	34	Full Professor
Hughes	Psychology	F	52	69	13	Associate Professor
Ramirez	Mathematics	F	30	68	5	Assistant Professor
Turner	Sociology	M	38	70	9	Assistant Professor

Which variables are qualitative and which are quantitative variables?

Qualitative variables:

Quantitative variables: