

**STAT 2606: BUSINESS STATISTICS I**  
**ASSIGNMENT 1**

**SECTIONS A, C DUE WEDNESDAY, SEPTEMBER 26 IN CLASS**  
**SECTION B DUE FRIDAY, SEPTEMBER 28 IN CLASS**

**PART A - Multiple Choice**

1. The set of all objects or measurements under consideration in a statistical study is a  
(a) parameter (b) data set (c) population (d) sample (e) statistic
2. The process of using information from a sample to draw conclusions about the entire population is called  
(a) sampling (b) the scientific method (c) statistical inference (d) descriptive statistics
3. A numerical measure computed from sample data is called a  
(a) parameter (b) statistic (c) sample (d) population
4. A portion or subset of a population is a  
(a) parameter (b) statistic (c) sample (d) population
5. A numerical measure computed to describe a characteristic of a population is called a  
(a) parameter (b) statistic (c) sample (d) population

**PART B - Complete Answer Questions**

6. For each of the following situations describe the population of interest and the sample.
  - (a) A politician who is running for the office of mayor of a city with 25,000 registered voters commissions a survey which interviews 200 registered voters.
  - (b) A manufacturer of computer chips claims that less than 10% of his products are defective. In order to check this claim 1000 chips were drawn from the production process and checked for defects.
7. Identify the following variables as either categorical (qualitative) or quantitative. If a variable is categorical, specify if it would be measured on a nominal or ordinal (ranked) scale. If a variable is quantitative, specify if it would be measured on an interval or ratio scale.
  - (a) the number of students who get a grade greater than 80% in STAT 2606
  - (b) dress size: 3, 5, 7, 9, 11, 13, 15, 17
  - (c) weight of a newborn in kg
  - (d) colour of the cars in a parking lot
  - (e) mark out of 100 obtained on a test
  - (f) letter grade obtained on a test
  - (g) rating of a professor as: excellent, good, fair, poor
  - (h) time taken to write a test

8. A quality control inspector for a production process has just obtained the following measurements on the length (in cm) of 28 randomly selected dowels from the process and wants to use them to check whether the process is producing acceptable dowels. The 28 measurements are below in no particular order.

6.39 6.44 6.42 6.61 6.53 6.47 6.62 6.63 6.07 6.29 6.34 6.26 6.57 6.46 6.55 6.34 6.30 6.36  
6.79 6.75 6.29 6.10 6.68 6.58 6.27 6.85 6.65 6.50

- (a) Do these measurements represent a sample or a population? Give reasons for your answers.
  - (b) (i) Find the mean (ii) draw a stem-and-leaf plot for the data with stems 60, 61,  $\dots$ , 68 and a leaf unit = 0.01. (iii) Find the median (Hint: use the stem-and-leaf plot to help you)
  - (c) Describe the shape of the distribution (is it symmetric, skewed left, skewed right, bell-shaped, etc., are there obvious outliers).
  - (d) Would the mean or the median be the most suitable measure to use to represent the central location of this distribution? Give reasons for your answer.
9. For the data in Question 8, use SAS to find the sample mean, sample variance, median, 1st quartile, and 3rd quartile. Also draw a histogram and a box plot, and comment on the shape of the distribution. Show your SAS output and the plots. (Following SAS codes, as used for a data example, can be used here.)

```
DATA tests;
INPUT mark;
CARDS;
77
68
86
84
95
84
87
RUN;
PROC UNIVARIATE PLOT plotsize=30;
VAR mark;
RUN;
```

10. (a) Consider a sample with the following four values: 1, 5, 8 and 11. Compute the following quantities.
- i)  $\sum_{i=1}^4 2$
  - ii)  $\sum_{i=1}^4 2x_i$
  - iii)  $\sum_{i=1}^4 (2x_i)^2$
- (b) Give a counter example to show that  $\sum_{i=1}^n x_i^2$  is NOT equal to  $(\sum_{i=1}^n x_i)^2$
- (c) Prove that i)  $\sum_{i=1}^n (x_i - \bar{x}) = 0$       ii)  $\sum_{i=1}^n (x_i - \bar{x})^2 = \sum_{i=1}^n x_i^2 - (\sum_{i=1}^n x_i)^2/n$