

## MATHEMATICS 201-510-LW

Business Statistics

Martin Huard

Fall 2008

# Assignment #1

This assignment is due on **Thursday September 4, 2008** at the beginning of class. Complete solutions are expected.

### Question 1 (2 points)

When meeting new clients, a banker will usually gather a certain amount of information on her client. Some of that information follows:

- Annual Salary
- Type of Investment (High Risk, Average Risk, Low Risk)

For the information in parts (a) and (b) list the level of measurement (nominal, ordinal, interval or ratio).

### Question 2 (2 points)

Identify each of the following samples by naming the sampling technique used (cluster, convenience, simple random, stratified, systematic).

- Ask every thirtieth client entering a bank is asked to complete a survey.
- Divide the clients of a bank according to their type of investment (high risk, average risk and low risk) and then select a random sample from each type of investment to survey the clients about the quality of services being offered.

### Question 3 (15 points)

Sarah wants to determine the mean number of hours per week a student at St. Lawrence study. To accomplish this, she passed a questionnaire to 10 students chosen at random from their registration number. The results were:

4      12      7      10      15      5      2      19      15      18

- What is the population?
- What is the variable?
- Is the variable qualitative or quantitative?
- Find the mean
- Find the median
- Find the mode
- Find the 12% trimmed mean
- Find the range
- Find the variance
- Find the standard deviation
- Find the coefficient of variation
- Find  $Q_1$  and  $Q_3$ .
- Find the interquartile range.
- Draw a box and whisker plot.

**Question 4** (4 points)

The following frequency distribution shows the amount of money spent at a large retail store for a random sample of 200 customers who bought something.

Amount Spent (in \$)	Frequency
0 – 59	28
50 – 99	62
100 – 159	52
150 – 199	33
200 – 249	17
250 – 299	8

- Use this frequency distribution to estimate the mean amount of money spent.
- Use this frequency distribution to estimate the standard deviation for the amount of money spent.

**Question 5** (10 points)

A supermarket chain wishes to see if there is correlation between the annual income of a family and the weekly grocery bill. For this, a random sample of 8 people was taken, where each gave their annual income and average weekly grocery bill. Here are the results.


Annual income (in 1000 \$)	51	74	39	45	41	105	37	21
Weekly grocery bill (in \$)	123	135	89	120	122	117	105	95

- Find the equation of the least-squares line.
- Find the coefficient of correlation.
- Find the coefficient of determination.
- If a family has an annual income of \$60 000, what is the expected weekly grocery bill?
- Sketch a scatter diagram containing the least-squares line and its equation.

**Questions 6 to 8 are to be done using Excel**

For these questions, hand-in the printouts of your Excel sheets and copy your Excel work in the Test folder for Business Statistics (W:\Tests\mhuard\Business Statistics\Assignment 1), where your name should be included in the name of the file (for example: Assignment 1 – Your Name). Make sure that your answers are well organized with appropriate labels, and rounded off to an appropriate number of decimal places.

Open the file “Data – Assignment 1” from my web site, and save it under “Assignment 1 – Your Name”. Note that you may have to enable macros to be able to generate the data. If the macros

are not enabled (that is, if the data does not appear at the click of the button) then go to  - EXCEL OPTIONS – TRUST CENTER – TRUST CENTER SETTINGS – MACRO SETTINGS and choose the ENABLE ALL MACROS option. Note that you may need to close your document and open it again.

**Question 6** (8 points)

A sample of customers at a Sports Retail Store was taken, where each indicated their favorite sport.

- a) Go to the worksheet "Sheet1", rename it appropriately, make the usual heading in cells A1:A4, then click on the "GENERATE DATA" button to get your data.
- b) Construct a relative frequency distribution table for the favorite subject of students (Hockey, Skiing, Snowboarding, Tennis, Other). (Note: Excel must do all of the counting!)
- c) Sketch a Pareto Diagram.
- d) Sketch a Pie Diagram.

**Question 7** (12 points)

In a study on the use of debit cards, a bank manager took a random sample of transactions made with the use of a debit card, and recorded the amount of the transaction (in \$).

- a) Go to the worksheet "Sheet2", rename it appropriately, make the usual heading in cells A1:A4, then click on the "GENERATE DATA" button to get your data.
- b) Find the mean.
- c) Find the median
- d) Find the standard deviation.
- e) Find the third quartile.
- f) Find the 47<sup>th</sup> percentile.
- g) Find the range.
- h) Find the 12% trimmed mean.
- i) Make a relative frequency distribution table. (Note: Excel must do all of the counting!)
- j) Sketch a histogram.

**Question 8** (7 points)

Sociability can be expressed in a number of different ways, including having a lot of friends and dating frequently. A researcher asked a sample of college students about how many good friends they have and how many dates they have had in the past month.

- a) Go to the worksheet "Sheet3", rename it appropriately, make the usual heading in cells A1:A4, then click on the "GENERATE DATA" button to get your data.
- b) Find the coefficient of correlation.
- c) Find the coefficient of determination.
- d) Find the equation of the least squares line.
- e) If a student has 5 good friends, how many dates is he be expected to have had in the past month?
- f) Sketch a scatter diagram containing the least-squares line and its equation.