ASSIGNMENT 1
Due: July 20th , 2017 9:00 a.m. (Drop boxes Loyola 2nd floor)

MARKS= 46 + 12 + 36 + 14 = 108 **Mark:_____/108____**

Section _____ Name (print) _____

Student # _____Signature _____

Important instructions:

1. **Print out a hard copy** of this assignment and then answer each question in the space provided using pen or pencil. Hand in this hard copy with your answers written on it. Ensure all the numbered pages are in the correct order. Failure to do so will result in a grade of 0 for the assignment.
2. Please show all rough work and not just the final answer.
3. The assignments **DO NOT COVER** all material for which you are responsible. Consult the course outline for this information. To learn the materials covered in this course, you need to do a lot of exercises. The practice problems posted provide solutions to many examples.
4. Assignments are to be done individually. Plagiarism will not be tolerated.
5. Assignments are to be remitted to the appropriate drop box by the due date and time.
6. Be sure to use correct notation and show how you found each answer. Include statements.
7. Before beginning this assignment, you should have completed the following:
   - Reviewed the class examples
   - Completed Lab 1
   - Completed Practice Assignments 1-3a
   - Reviewed the solutions to Practice Assignments 1-3a
8. This assignment is a ***sampling*** of question types. Preparation for Test #1 should include ***all*** questions provided to you (i.e. class examples, Practice Assignments, Practice Test and this assignment).
9. When including Excel work, please copy and paste into this document and include with any hand-written work.
10. If ***appropriate,*** please include references/citations. This is not necessary if you did the entire assignment on your own.

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1. **[46]** Using the data file ***MGSC2207 SSII 17 A1 Data,*** and the tab labelled: ***MutFundRtns*** to answer the following:

(a) What level of measurement is "***Mutual Fund"***?

(b) What level of measurement is "***Return (%)"***?

(c) Is this data set ***Time Series*** or ***Cross-sectional?*** Why?

(d) Calculate the mean return. (Show the formula, substitutions and units.)

(e) Calculate the median return. (Show the formula, substitutions and units.)

(f) Calculate the Standard Deviation of the returns for these companies. (Show the formula, substitutions and units.)

TOTAL marks for page = [14]

(g) Develop a relative frequency table for the returns.

(h) Using Excel, produce a ***relative frequency histogram*** for the returns. Insert your graph here:

TOTAL marks for page = [10]

(i) Comment on the skewness of the data set.

(j) Determine the first quartile, third quartile and IQR for the returns. (Show the formula, substitutions and units.)

(k) Develop a 95% confidence interval for the proportion of companies with a return exceeding 10%. (Include formula, substitutions, calculations & statement.)

TOTAL marks for page = [16]

(l) Develop a 90% confidence interval for the mean return. (Include formula, substitutions, calculations & statement.)

TOTAL marks for page = [6]

2. **[12]** In a recent poll of 1000 teens across Canada, 37.3% are bullied sometime during their high school years. It is believed that the true proportion of all teens bullied in high school is 35%.

a) What is the probability that the sample proportion of teens "bullied" in a random sample of 1000 would be within $\pm$5% of the population proportion.

b) What is the probability that in a random sample of 1000 teens, 37.3% or more are bullied in high school?

c) Given that the statistic in b) was actually observed, do you believe there is evidence that the true proportion of teens who are bullied has increased?

TOTAL marks for page = [12]

3. **[36]** Keynote Systems estimates the time it takes to complete a purchase transaction on various e-commerce web sites. In June 2010, Keynote reported the average transaction time to be 23.0 seconds on the Target web site and 16.3 seconds on the Sears web site. Suppose that the standard deviation for transaction times is 5 seconds for both web sites.

a) If random samples of 30 transaction times on the Target web site are selected, what proportion of the sample means will be between 22 and 24 seconds?

b) If random samples of 30 transaction times on the Target web site are selected, what proportion of the sample means will be between 21 and 25 seconds?

c) If random samples of 30 transaction times on the Sears web site are selected, what proportion of the sample means will be greater than 25 seconds?

TOTAL marks for page = [12]

d) If random samples of 30 transaction times on the Sears web site are selected, what proportion of the sample means will be between 15 and 18 seconds?

TOTAL marks for page = [4]

e) If random samples of 30 transaction times on the Sears web site are selected, what proportion of the sample means will be between 14 and 19 seconds?

f) If random samples of 30 transaction times on the Sears web site are selected, what proportion of the sample means will be greater than 25 seconds?

g) What is the probability that an individual transaction on the Target website will take longer than 25 seconds?

TOTAL marks for page = [12]

h) What is the probability that an individual transaction on the Sears website will take longer than 25 seconds?

i) Compare the results of (c) and (g), (f) and (h). Explain.

j) **[2]** What assumptions, if any, do you have to make about the probability distribution of the population of transaction times to complete a) through f)?

TOTAL marks for page = [8]

4. **[14]** The owner of a restaurant serving continental food wants to study characteristics of customers of his restaurant. In particular, he decides to focus on two variables: the amount of money spent by customers and whether or not customers order dessert. The results from a sample of 60 customers are as follows:

- Amount spent: mean = $38.54; standard deviation = $7.26
- 18 customers purchased dessert

a) Set up a 95% confidence interval estimate of the population average amount spent per customer in the restaurant.

b) Set up a 90% confidence interval estimate of the population proportion of customers who purchase dessert.

TOTAL marks for page = [8]

Assuming the owner of a competing restaurant wishes to conduct a similar survey in her restaurant (and does not have access to the information obtained by the owner of the first restaurant), answer the following:

c) If she wants to have 95% confidence of estimating the true population average amount spent in her restaurant to within ± $1.50 and the standard deviation is assumed to be $8, what sample size is needed?

d) If she wants to have 90% confidence of estimating the true proportion of customers who purchase dessert to within ± 0.04, what sample size is needed?

e) Based on your answers to c and d, what size sample should be taken?

TOTAL marks for page = [6]