BUS 210, Final Exam A, Fall 2018   Name _____ KEY _____

                                           Section _____

Instructions: This exam is in two parts: Part I is to be completed partly at home using the materials posted on Blackboard for Part I and you will answer questions about that work in class below; Part II is to be completed entirely in class. You may not use cell phones, and you may only access internet resources you are specifically directed to use. You may access your data file for Part I of the exam in Blackboard. You may access the data files posted to Blackboard for the Exam part II. Be sure you are using the data file that matches the exam version you are given.

Part I: At Home
This part was completed at home. You can upload the Excel file for Part I to the Part I folder in Blackboard for use during the Exam period. However, this submission will not be graded in this location.

Part II: In Class

1. Use the work done at home to answer the Part I questions.
2. Open the file from the in-class portion of the final posted on Blackboard that corresponds to the version of the exam you have. This is Exam A.
3. Answer the questions corresponding to the data file, and any additional calculation in Excel required.
4. When you have finished answering questions on the exam, and all your answers have been recorded on the paper test for grading, upload both the take home Excel file and the in-class Excel file to the same in-class Exam folder in Blackboard for grading. Only those files submitted to the correct folder will be graded.
5. Turn in your paper copy of the exam to your instructor.
6. Enjoy your break!

Part I:

The following questions are based on problem #1a from Part I:

1. What is the 5-number summary of Weight (combined)? (6 points)

   Min: 142
   1st Q: 174
   Median: 190

   3rd Q: 210
   Max: 258

2. What is the mean and standard deviation of Credit Card Debt? (6 points)

   $1,431.20 mean
   $1,278.04 st. dev

The following questions are based on problem #1b from Part I:

3. Consider the pivot table of Have Tried vs. Dwell Type. Suppose a survey respondent is randomly selected from the pool.
   a. What is the probability the person has tried the product? (6 points)

   495/856 = 0.578

   b. What is the probability that the person lives in a Condo? (6 points)

   239/856 = 0.279

   c. What is the probability that the person both has tried the product and lives in a condo? (6 points)

   132/856 = 0.154

d. What is the probability that the person has tried the product given that they live in a condo? (6 points)

$$132/239 = 0.552$$

e. What is the probability the person lives in a condo given that they have tried the product? (6 points)

$$132/495 = 0.267$$

f. What is the probability that the person has either tried the product or lives in a condo? (6 points)

$$(239+495-132)/856 = 0.703$$

g. Are the variables Have Tried and Dwell Type independent? Why or why not? Show math to support your conclusion. (10 points)

$$P(A|B) = 0.552 \neq P(A) = 0.578$$

$$P(A \text{ and } B) = 0.154 \neq P(A)*P(B) = 0.161$$
dependent (similar, but not identical)

4. Use the bar graph to describe something about how one of the variables differs in this survey with respect to having tried the product or not. Explain. (6 points)

answers will vary

The product is much more likely to have been tried in West Neighborhood

The following question is based on problem #1c from Part I:

5. Using your histogram of Mall Trips, describe the shape of the distribution. (5 points)

right skewed

The following question is based on problem #1d from Part I:

6. Looking at the comparative box plot (and descriptive stats) of age, is there any evidence of a skew in any of the data? Would you describe that evidence as strong or weak? (6 points)

there is, strongest in South and West neighborhoods (right)

7. How is the variable age affected by the variable Neighborhood? (4 points)

Spread is similar in East and South

The following question is based on problem #1e from Part I:

8. From your pie graph of Dwell Type, which type of dwelling appears to be the most common? What percent of the survey takers reported that type of dwelling? (6 points)

47% for Home

The following questions are based on problem #2 from Part I:

9. Looking at the scatterplot of your three variables vs. Blood pressure, which variable produced the highest correlation? Report the linear regression equation and R^2 value for that variable. (8 points)

age $y = 1.1775x - 7.962$
$R^2 = 0.4687$

10. Interpret what the R^2 value means in the context of the data. (8 points)

46.9% of the variability in blood pressure can be explained by change in age

11. Did any of the variables produce a negative correlation? Which one? Why does this make sense in the real world? If none of them produced a negative correlation, explain why that makes sense given the variables. (6 points)

Yes — exercise

Yes, since more exercise means healthier which means lower BP

12. For the scatterplot for the weakest correlation, is the graph weak linear, or is the correlation week because the relationship is strongly nonlinear? Explain. (6 points)

weak linear (not strongly nonlinear)

variables are just all over the place

The following question refers to problem #3 of Part I:

13. What is the mean and standard deviation of the probability distribution provided? (6 points)

mean 8.35
St. dev 11.61

The following questions refer to problem #4 of Part I:

14. Report the values of the three probabilities you calculated: normal approximation, binomial formula, simulation. Label each clearly. (8 points)

normal approx — 0.0060
binomial — 0.0064

simulation — 0.1692   answers will vary

15. We discussed three different categories of probabilities: classical or theoretical, experimental or observational, and personal or subjective. Two of those types are represented in this question. Which two? Give an example of the missing one. (8 points)

binomial and normal approximation are classical

Simulation is experimental

Subjective: I think I did great on this test! (There is a 90% chance that...)

Calculations in Excel: (1) 40 points, (2) 20 points, (3) 10 points, (4) 20 points.
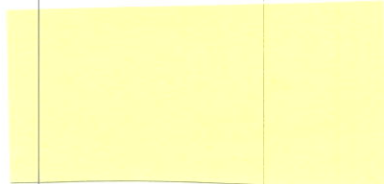
Part II:

16. Suppose that the annual return on XYZ stock follows a normal distribution with mean 13% and standard deviation 7.2%.

    a. What is the probability that XYZ's value will decrease during the following year? (i.e. percent return will be less than 0%) (8 points)
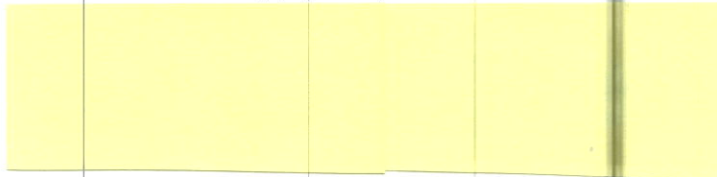
    0.035

    b. What is the probability that XYZ's return will be greater than 15%? (8 points)

    39.06%

    c. For what percent return value does XYZ stock have only a 5% chance of exceeding that value? (8 points)

    24.8%

    d. What is the probability of XYZ's rate of return will fall between 10% and 18%? (8 points)

    41.78%

17. Suppose that Comdell Computer receives its hard drives from Diskco. On average, 3% of all hard disk drives received by Comdell are defective.

   a. Comdell has adopted the following policy: It samples 50 hard drives in each shipment and accepts the shipment if all hard drives in the shipment are not defective. What fraction of shipments will Comdell accept? (6 points)

   21.8%

   b. Suppose instead that the shipment is accepted if at most one hard drive in the sample is defective. What fraction of shipment will Comdell accept? (6 points)

   55.5%

   c. What is the probability that a sample size of 50 will contain at least 5 defectives? (6 points)

   0.017

Upload your completed Excel files (**both of them!**) to the Final Exam **to be graded** submission box in Blackboard and submit your completed paper exam to your instructor. You may not modify anything once the exam is submitted.

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B) \qquad P(A|B) = \frac{P(A \text{ and } B)}{P(B)}$$

$$\mu = E(X) = \sum x_i p(x_i) \qquad \sigma^2 = Var(X) = \sum (x_i - \mu)^2 p(x_i)$$

$$\mu_{binomial} = np \qquad \sigma^2_{binomial} = np(1-p)$$