PSY 440 Practice Exam #1

Please read all instructions carefully. If you have any questions whatsoever, please do not hesitate to ask the instructor, who will cheerfully decline to answer any questions that are inappropriate. Remember, the exam should also be an opportunity for learning. All responses should be presented in the form of complete and grammatically correct sentences unless otherwise stated. Additionally, you should assume that each question is asking for the single best answer, and responses that may be technically correct but are not the best answer may not receive full credit. Also, be sure to show all of your work because partial credit will be awarded for wrong answers if the correct formula or process is in evidence. Likewise, correct answers that are written without supporting work will not receive full credit. For answers that require writing, you have the option of Word Processing your responses rather than writing them out long-hand. Be very careful to save your answers often and be prepared to send them as an email attachment or submit them on diskette if the printer is not working. No additional time will be allowed to handle printer-errors.

You may use the tables in your book or you may use an online version (e.g., http://davidmlane.com/hyperstat/z_table.html).

Additionally, several questions require you to access an online data set, available by link from the course web page or directly from

http://www.ilstu.edu/~mshesso/Courses/Psy440/Practice_Exams/P_EXAM_1.3AV

Be sure to use Internet Explorer to download the data (right-click on the link from the course web page) to save it to diskette or your H: drive. Attempting to download this file with Netscape Navigator will result in an error.

1. Imagine that you are the director of a customer service calling center and that one of your duties involves monitoring and evaluating the number of times (recorded as a percentage of calls) that a caller hangs-up on each worker. When you started your job, you were told that calling center had an average hang-up rate of 35% with a standard deviation of 10.0 (i.e., μ = 35.0, with σ = 10.0). Another measure used in the calling center is a customer satisfaction survey that has 10 questions scored on a 7 point likert scale. The satisfaction scale is scored so that higher values mean the customer was more satisfied with the service; you are also told that this scale has a mean of 3.5, with a standard deviation of 2.0 over a long period of use in the calling center. Finally, you are told that the customer satisfaction data and the hang-up rates are assumed to be independent of each other. Use this information to address the following questions.

(a) If a single worker is singled out for having a hang-up rate of 57%, what is the corresponding Z-score?
(b) Determine the probability of a worker having a hang-up rate this high or higher by chance alone.

(c) In discussing this issue, the worker claims that the day in question was a fluke. Thus, you decide to randomly select 16 days’ data and average the hang-up rates on these 16 days. Address the following questions.

i. What is the standard error of this average?

ii. How high an average hang-up rate (over 16 days) would be needed to be at the 75th percentile?

iii. If this average is 42%, what is the corresponding z-score?

iv. How likely is it that an average of 16 days would be as higher or higher than this average of 42%.

v. Which information provides a more compelling reason why the worker should be let go? The single day rate of 57% or the average rate of 42%?
(d) A new office worker is asked to use SPSS to compile a data set of hang-up rates (coded as percentages) for the workers and generate a report of descriptive statistics based on gender. Examine the table below, decide whether these results are meaningful, and then write a short paragraph to explain what the numbers mean or why they need to be recomputed.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Mean</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>2.00</td>
<td>0.00</td>
<td>18</td>
</tr>
<tr>
<td>Women</td>
<td>1.00</td>
<td>0.00</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>33.47</td>
<td>12.81</td>
<td>42</td>
</tr>
</tbody>
</table>

(e) Your boss asks you to combine the performance data from the hang-up rate (X) and the customer satisfaction survey (Y) into a single score for which higher values indicate better performance. Address the following:

i. Consider $T = X + Y$. Find $\mu_T$ and $\sigma_T$.

ii. Consider $W = X - Y$. Find $\mu_W$ and $\sigma_W$.

iii. Consider $V = 5Y - X$. Find $\mu_V$ and $\sigma_V$. 
iv. Which of the three combinations would satisfy your boss’ request? Explain briefly.

2. Using the data online, address the following questions.

(a) Test whether or not the categories of parental marital status occur with equal frequency (e.g., are equally likely) based on this sample. Present your findings in APA format, including observed frequencies for all categories and all information necessary for the inference.

(b) The Brief Symptom Inventory Global Scale was administered, and historically, this instrument has had a mean of 30. Test whether our sample is significantly more distressed. Present your findings in APA format, including all necessary descriptive and inferential statistics. Your short paragraph should also include some type of statement of conclusion.
3. Write a short paragraph to explicate how each hypothesis test we have covered ($\chi^2$ test of proportions, $\chi^2$ test of independence, one sample z-test, and the one sample t-test) have employed a mathematical model. Thus, you should describe each model for the above tests and explain the how these models related to each other (e.g., similarities and dissimilarities).