***E370, Spring 2016***

***Lab Activities week of 2/8/2016***

***Valued at 25 points***

Solve the following problems. Please follow the instructions given and show your work to obtain full credit. The data sets required for this activity can be found in Oncourse under *Resources🡺Lab Manual Data,* or in Box at <https://iu.box.com/E370-Files> **in the folder Lab Manual Data Files.**

1. **The following table shows the probability distributions of job satisfaction scores for senior executives and middle managers. For the satisfaction score, 5 means most satisfaction, and 1 means least satisfaction. (6 points)**

|  |  |
| --- | --- |
| X=Satisfaction | P(X) |
| Senior Executives | Middle Managers |
| 1 | 0.05 | 0.04 |
| 2 | 0.09 | 0.1 |
| 3 | 0.03 | 0.12 |
| 4 | 0.42 | 0.46 |
| 5 | 0.41 | 0.28 |

1. **What is the probability that a senior executive will report a job satisfaction score of 4 or 5? (1 point)**
2. **What is the probability that a middle manager will report a job satisfaction score less than 3? (1 point)**
3. **Calculate the appropriate statistics and compare the overall job satisfaction of senior executives and middle managers. (4 points)**
4. **Use the dataset “QuitTeles.xls”. This data set describes a sample of employees’ ages and the number of weeks each worked before quitting at a telemarketing company. Answer the following questions. (7 points)**
5. **Calculate the statistics requested in this table. (2 points)**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Expected Value** | **Variance** |
| Age |  |  |
| **Employment** |  |  |
| **Covariance of Age and Employment** |  |

1. **Suppose the telemarketing company gives every employee a sum of money when they quit the job. The amount is given according to 100\*Employment + Age. Calculate the expected value and variance of the amount of money given. (5 points)**
2. **The following table shows the joint probability distribution of bottles of coke and chicken wings an average customer buys daily in a fast food restaurant. (12 points)**

|  |  |
| --- | --- |
|  | **Coke** |
| **Chicken Wings** | **0** | **1** |
| **0** | **0** | **0.04** |
| **1** | **0.16** | **0.25** |
| **2** | **0.2** | **0.35** |

1. **What is the probability that an average customer buys 1 bottle of coke? (2 points)**
2. **Calculate the statistics requested in this table. (3 points)**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Expected Value** | **Variance** |
| Coke |  |  |
| **Chicken Wings** |  |  |

1. **Suppose that the price of a bottle of coke is $1.50, and the price of a chicken wing is $3.00. Assuming that purchases of Coke and Chicken Wings are independent, what is the expected value and variance for the amount of money that an average customer spends daily in this fast food restaurant? (5 points)**
2. **Later calculations reveal that Coke and Chicken Wing purchases are NOT independent, but instead have a correlation coefficient of −0.55. By how much does this information change the variance calculated in the previous question and in what direction, if at all? (2 points)**