

Name: _____

Math 1350: Final Project
Analyzing Employee Pay Data from the City of Albuquerque

Background:

In recent years, the city of Albuquerque has pledged to increase transparency in city government. As part of this effort, the city publishes public data related to crime, the city budget, parks and recreation, transportation, and even the incomes of all its employees. For our final project, we'll be focusing on the pay of city workers.

Employee pay data includes the names, departments, hourly wages, year-to-date pay, and titles of more than 5000 employees from departments across the city. These employees include police officers, firefighters, airport workers, sanitation workers, accountants, museum docents, city councilors, the mayor, and many others. You can access graded employee pay data (and a whole lot of other data) on the city's website at <https://www.cabq.gov/abq-view>.

Instructions:

I've randomly selected (using a random number generator) a list of 50 city employees and their accompanying pay information. I've edited down the information to include only the names, departments, and year-to-date pay of the employees. I've also sorted the data from lowest pay to highest pay to make it your calculations and data entry easier. An Excel file and a plain text file containing this data is attached.

Use this data set to answer the questions about pay information of city employees that follow.

- You may use your calculator, Microsoft Excel (Strongly Recommended), and/or your tables (A.2 and A.3) for your computations.
- Please write your answers neatly in the spaces provided on the following pages.
- Show your work and/or formulas in order to receive partial credit.

1. Summarize the Data:

- a) Compute the mean pay of our sample of city workers.
- b) Compute the median pay of our sample of city workers.
- c) Is the distribution of pay skewed left, right, or is it symmetric?
- d) Compute the standard deviation of the pay of our sample of city workers.
- e) Give the five-number-summary of the data.
- f) Use the IQR method to determine whether there are any outliers in the data.
- g) Draw a boxplot of the dataset.

2. Predict a Value:

Using the data provided, compute a confidence interval for the average salary of an employee of the city of Albuquerque at a 95% confidence level.

- a) Give the point estimate.

- b) Find the critical value.

- c) Compute the standard error.

- d) Compute the margin of error.

- e) Give the confidence interval.

- f) Summarize the findings of the confidence interval in a sentence or two.

3. Answer a Question:

Looking at the list of data, many of the highest salaries seem to be those of police officers. Use the data to determine whether this conjecture is true. Is the average pay of someone in the Police Department higher than the average pay of other city workers at a significance level of $\alpha=0.05$? Use the P-value method and assume that the populations are normally distributed.

- a) State the null and alternate hypothesis.
- b) Give the significance level. What does this value represent?
- c) Compute the test statistic.
- d) Compute the P-value.
- e) Determine whether to reject the null hypothesis.
- f) State your conclusion in plain English.