

Homework6

PS 2010

Due: Nov 21th, 8:59:59am

Notice: The grading will mainly focus on the steps not the final results. This means even your final results are wrong but you follow the correct steps, you will be given the full score.

Hypothesis Testing

1. The hourly wages in a particular industry are normally distributed with mean \$13.20 and standard deviation \$2.50. A company in this industry employs 40 workers, paying them an average of \$12.20 per hour. First, calculate the P-value. Second, can this company be accused of paying substandard wages? Use an $\alpha = .01$ level test.

2. The output voltage for an electric circuit is specified to be 130. A sample of 40 independent readings on the voltage for this circuit gave a sample mean 128.6 and standard deviation 2.1. Test the hypothesis that the average output voltage is 130 against the alternative that it is less than 130. Please also calculate the P-value. Use a test with level .05.

3. Nutritional information provided by Kentucky Fried Chicken (KFC) claims that each small bag of potato wedges contains 4.8 ounces of food and 280 calories. A sample of ten orders from KFC restaurants in New York and New Jersey averaged 358 calories.

- If the sample standard deviation was $s = 54$, is there sufficient evidence to indicate that the average number of calories in small bags of KFC potato wedges is greater than advertised? Test at the 1% level of significance.
- Find the associated P-value.

Matrix Questions

1. Calculate the following

(a)

$$\begin{bmatrix} 2 & 6 \\ -6 & 4 \end{bmatrix} \cdot \left(\begin{bmatrix} 5 & 3 \\ -6 & 2 \end{bmatrix} + \begin{bmatrix} 1 & 2 \\ 2 & 0 \end{bmatrix} \right)$$

(b)

$$\begin{bmatrix} -1 & -1 \\ -6 & 3 \end{bmatrix} + \begin{bmatrix} -5 & -1 \\ -4 & 2 \end{bmatrix} \cdot \begin{bmatrix} 3 & 6 \\ 1 & 6 \end{bmatrix}$$

2. Write the following system of equations to matrix format:

$$3x + y - z = 1$$

$$x - y + z = -3$$

$$2x + y + z = 0$$