STA13 Homework 5

November 13, 2021

1. Flextime A company was contemplating the installation of a flextime schedule in which a worker schedules his or her work hours or compresses work weeks. The company estimates that it needs a minimum mean of 7 hours per day per assembly worker in order to operate effectively. Each of a random sample of 80 of the company's assemblers was asked to submit a tentative flextime schedule. If the mean number of hours per day for Monday was 6.7 hours and the standard deviation was 2.7 hours, do the data provide sufficient evidence to indicate that the mean number of hours worked per day on Mondays, for all of the company's assemblers, will be less than 7 hours? Test using $\alpha = .05$.

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2. What's Normal? What is normal, when it comes to people's body temperatures? A random sample of 130 human body temperatures, provided by Allen Shoemaker [3] in the Journal of Statistical Education, had a mean of $98.25°$ and a standard deviation of $0.73°$. Does the data indicate that the average body temperature for healthy humans is different from $98.6°$, the usual average temperature cited by physicians and others? Test using both methods given in this section.

1. Use the p-value approach with $\alpha = .05$.

2. Use the critical value approach with $\alpha = .05$.

3. Compare the conclusions from parts a and b. Are they the same?

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3. Starting Salaries As a group, students majoring in the engineering disciplines have the highest salary expectations, followed by those studying the computer science fields, according to results of NACE's 2010 Student Survey. [6] To compare the starting salaries of college graduates majoring in engineering and computer science, random samples of 50 recent college graduates in each major were selected and the following information obtained.

Major	Mean ($)	SD
Engineering	56,202	2225
Computer Science	50,657	2375

Do the data provide sufficient evidence to indicate a difference in average starting salaries for college graduates who majored in engineering and computer science? Test using $\alpha = .05$.

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4. Man's Best Friend The Humane Society reports that there are approximately 77.5 million dogs owned in the United States and that approximately 40% of all U.S. households own at least one dog. In a random sample of 300 households, 114 households said that they owned at least one

dog. Does this data provide sufficient evidence to indicate that the proportion of households with at least one dog is different from that reported by the Humane Society? Test using $\alpha = .05$.

5. A Cure for Insomnia An experimenter has prepared a drug-dose level that he claims will induce sleep for at least 80% of people suffering from insomnia. After examining the dosage we feel that his claims regarding the effectiveness of his dosage are inflated. In an attempt to disprove his claim, we administer his prescribed dosage to 50 insomniacs and observe that 37 of them have had sleep induced by the drug dose. Is there enough evidence to refute his claim at the 5% level of significance?

6. Treatment versus Control An experiment was conducted to test the effect of a new drug on a viral infection. After the infection was induced in 100 mice, the mice were randomly split into two groups of 50 . The first group, the control group, received no treatment for the infection, and the second group received the drug. After a 30 -day period, the proportions of survivors, $\hat{p}_1$ and $\hat{p}_2$, in the two groups were found to be .36 and .60, respectively.

1. Is there sufficient evidence to indicate that the drug is effective in treating the viral infection? Use $\alpha = .05$.

2. Use a 95% confidence interval to estimate the actual difference in the survival rates for the treated versus the control groups.