**Stats Exam 3 Review Ch. 8 - 11**

1. The drug Eliquis is used to help prevent blood clots in certain patients. In clinical trials, among 5924 patients treated with Eliquis, 153 developed the adverse reaction of nausea. Use a 0.05 significance level to test the claim that 3% of Eliquis users develop nausea.
   1. What is the notation of the test statistic?
   2. State the null and alternative hypotheses.
   3. Is the test two-tailed, left-tailed, or right-tailed?
   4. Find the test statistic, critical value, and P-value.
   5. Write the final conclusion.
2. Data Set 21 “Earthquakes” in Appendix B lists earthquake depths, and the summary statistics are Use a 0.01 significance level to test the claim of a seismologist that these earthquakes are from a population with a mean equal to 5.00 km.
   1. What is the notation of the test statistic?
   2. State the null and alternative hypotheses.
   3. Is the test two-tailed, left-tailed, or right-tailed?
   4. Find the test statistic, critical value, and P-value.
   5. Write the final conclusion.
3. The Brazil vending machine dispenses coffee, and a random sample of 27 filled cups have contents with a mean of 7.14 ounces and a standard deviation of 0.17 ounces. Use a 0.05 significance level to test the claim that the machine dispenses amounts with a standard deviation greater than the standard deviation of 0.15 ounces specified in the machine design.
   1. What is the notation of the test statistic?
   2. State the null and alternative hypotheses.
   3. Is the test two-tailed, left-tailed, or right-tailed?
   4. Find the test statistic, critical value, and P-value.
   5. Write the final conclusion.
4. Data Set 26 “Cola Weights and Volumes” in Appendix B includes volumes of the contents of cans of regular Coke and volumes of cans of regular Pepsi .
   1. Use a 0.05 significance level to test the claim that cans of regular Coke and regular Pepsi have the same mean volume.
   2. Construct the confidence interval appropriate for the hypothesis test in part (a).
5. Which correlation coefficient means a stronger correlation: or 0.82?
6. Police sometimes measure shoe prints at crime scenes so that they can learn something about criminals. Listed below are shoe print lengths, foot lengths, and heights of males. Is there sufficient evidence to conclude that that there is a linear correlation between shoe print lengths and heights of males? Based on these results, does it appear that police can use a shoe print length to estimate the height of a male? Use Statdisk.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Shoe Print (cm) | 29.7 | 29.7 | 31.4 | 31.8 | 27.6 |
| Foot Length (cm) | 25.7 | 25.4 | 27.9 | 26.7 | 25.1 |
| Height (cm) | 175.3 | 177.8 | 185.4 | 175.3 | 172.7 |

1. Listed below are annual data for various years. The data are weights (metric tons) of lemons imported from Mexico and U.S. car crash fatality rates per 100,000 population. Is there sufficient evidence to conclude that there is a linear correlation between weights of lemon imports from Mexico and U.S. car fatality rates?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Lemon Imports | 230 | 265 | 358 | 480 | 530 |
| Crash Fatality Rate | 15.9 | 15.7 | 15.4 | 15.3 | 14.9 |

1. For 50 randomly selected speed dates, attractiveness ratings by males of their female date partners are recorded along with the attractiveness ratings by females of their male date partners . The 50 paired ratings yield

and . Find the best predicted value of (attractiveness rating by female of male) for a date in which the attractiveness rating by the male of the female is .

1. Heights (cm) and weights (kg) are measured for 100 randomly selected adult males. The 100 paired measurements yield

and . Find the best predicted value of (weight) given an adult male who is 180 cm tall.

1. In analyzing hits by V-1 buzz bombs in World War II, South London was subdivided into regions, each with an area of 0.25 . Shown below is a table of actual frequencies of hits and the frequencies expected with the Poisson distribution. Use the values listed and a 0.05 significance level to test the claim that the actual frequencies fit a Poisson distribution.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Number of Bomb Hits | 0 | 1 | 2 | 3 | 4 or more |
| Actual Number of Regions | 229 | 211 | 93 | 35 | 8 |
| Expect Number of Regions | 227.5 | 211.4 | 97.9 | 30.5 | 8.7 |

1. Consider a pack of chocolate M&Ms. There are 6 different colors: red, orange, yellow, green, blue, and brown. A sample pack of M&Ms has the following distribution: 212 blue, 147 orange, 103 green, 50 red, 46 yellow, 42 brown. Use a 0.01 significance level to test the claim that the distribution of M&M colors are equally likely.
2. The table below is from a study with the stated objective of addressing cell phone safety by understanding why we use a particular ear for cell phone use. The goal was to determine whether the ear choice is associated with auditory or language brain hemispheric dominance. Assume that we want to test the claim that handedness and cell phone ear preference are independent of each other.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Right Ear | Left Ear | No Preference |
| Right-Handed | 436 | 166 | 40 |
| Left-Handed | 16 | 50 | 3 |

1. Shown below are weights (kg) of poplar trees obtained from trees planted in a rich and moist region. The trees were given different treatments identified in the table below. The data are from a study conducted by researchers at Pennsylvania State University. Use a 0.05 significance level to test the claim that the different treatments result in the same mean weight.

|  |  |  |  |
| --- | --- | --- | --- |
| No Treatment | Fertilizer | Irrigation | Fertilizer and Irrigation |
| 1.21 | 0.94 | 0.07 | 0.85 |
| 0.57 | 0.87 | 0.66 | 1.78 |
| 0.56 | 0.46 | 0.10 | 1.47 |
| 0.13 | 0.58 | 0.82 | 2.25 |
| 1.30 | 1.03 | 0.94 | 1.64 |