THE NIGHT BEFORE THE AP STATS EXAM

1. I would like to estimate the average weight of all students at our school. I sample 50 students randomly and ask them their weight. The statistics from this sample are a mean of 135.4 lbs. with a standard deviation of 11 lbs.
2. Find and interpret a 95% confidence interval to predict the mean weight.
3. What is the margin of error of the interval?
4. What is the meaning of 95% confidence?
5. I randomly sample 50 students. 15 of them are considered overweight by certain standards. Use this to create a 90% confidence interval and interpret this.
6. You are testing the effects of a new protein powder on 140 mice. 70 mice are randomly chosen for the treatment group (new powder) and the remaining 70 mice are in the control group. The protein powder group gains an average of 0.8 lbs. with a standard deviation of 0.5 lbs. The control group gains an average of 0.4 lbs. with a standard deviation of 0.4 lbs. The control group and the protein group are independent.

Is there evidence that the average weight gained by mice taking the new protein powder is greater than the average weight gained by the control group? Test at 0.04 significance level.

1. Describe a Type I and Type II error for the mouse experiment (in context), including consequences of each error.
2. An SAT course evaluates its success by giving a pre-test and post-test to its students. Both of the tests are worth 100 points. The scores of 7 randomly selected students are shown below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Student | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Pre-test | 65 | 72 | 80 | 80 | 65 | 70 | 81 |
| Post-test | 67 | 76 | 85 | 84 | 62 | 70 | 80 |

Use a matched pairs t-test to determine if the course resulted in a statistically significant increase.

1. You are told that Trix colors are distributed equally. You randomly sample 100 Trix and see the following:

Red: 20 Yellow: 25 Green: 35 Blue: 20

Is there evidence to claim that a uniform distribution is incorrect?

1. A company randomly selects 100 employees and asks how they feel about the company dress code:

|  |  |  |
| --- | --- | --- |
|  | Men | Women |
| Think it is fair | 40 | 20 |
| Think it is not fair  | 15 | 25 |

1. What relationship does this table suggest about gender and dress code opinions?
2. Is the relationship statistically significant?
3. Once upon a time a class like yours made measurements of their arm span and height. There were 25 students in the class. They entered their results into a Minitab worksheet and obtained the following output:

Predictor Coef Stdev t-ratio P

Constant 11.547 5.600 2.06 0.056

Arm Span 0.84 0.08 10.39 0.000

S = 1.613 R-sq = 87.1

1. Write the linear regression equation, defining all variables.
2. What is the slope of the line and what does it tell us?
3. What is the correlation, and what does it tell us?
4. Is there a linear relationship between height and arm span? How do you know?
5. A student’s arm span was 60 inches and height was 65 inches. Find the residual of this data point.
6. Find the 95% confidence interval for the slope of the line.
7. Men’s heights are normally distributed with µ = 69.5” and σ = 2.5”

Women’s heights are normally distributed with µ = 65.5” and σ = 2.5”

1. Find the probability that a randomly selected man is taller than 72”
2. Find the probability that 3 out of 5 men are taller than 72”
3. Find the probability that a randomly selected man and a randomly selected woman have a combined height over 140”
4. Find the probability that a randomly selected woman is taller than a randomly selected man.
5. If p = 0.4, estimate the p-hat from a sample size of 10 using these random digits: 13832 15623 98994 32398