**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**NOTE: Type your answers in the appropriate fields; please make answer fields larger as needed. Please turn in a printed copy to Joe during next Friday’s lab or Melissa’s mailbox by 12 PM next Friday (please contact Melissa regarding exceptions; e.g., illness and travel). Please note, assignments will lose 5% of the total possible points for each day they are late.**

*Conceptual Questions*

1. Use the z-table provided in the hw04 folder on smartsite.

a. What is the probability of having a z-value less than -0.95?

b. What is the probability of having a z-value greater than -0.06?

c. What is the probability of having a z-value less than -3.02 or greater than 1.49?

d. What is the probability of having a z-value between -0.25 and 0.45?

1. Use the t-table provided in the hw04 folder on smartsite.

a. What are the critical t-values for a two-tailed t-test given an alpha of .05 and *df* of 1?

b. What is the critical t-value for a right-tailed t-test given an alpha of .05 and *df* of 10?

c. What is the critical t-value for a left-tailed t-test given an alpha of .01 and *df* of 100?

d. What are the critical t-values for a two-tailed t-test given an alpha of .05 and *df* of 4, 9, 14, 29, 99, and 1000? What is the absolute difference between each of these values and the critical z-values for a corresponding two-tailed z-test given an alpha of .05?

1. Continue using the t-table provided in the hw04 folder on smartsite.

a. Given an alpha of .05 what is the minimum sample size required to reject the null hypothesis using a two-tailed t-test given a t-value of 1.995?

b. Given an alpha of .05 what is the minimum sample size required to reject the null hypothesis using a one-tailed t-test given a t-value of -1.70?

c. Given an alpha of .01, what is the minimum sample size required to reject the null hypothesis using a two-tailed t-test given a t-value of -2.98?

*Computational Problems* – Complete by hand, you may use a calculator, show all work.

For intermediary calculations (e.g., mean and sd) round to four decimal places. Round your final answer to two decimal places.

1. Imagine that the common house fly lives for an average (mu) of 21 days. After some selective breeding, you have a small sample (N = 10) of specially bred flies that you think had longer than average lives compared to the common fly. Use the data below to test this. Report your conclusion and explain what this means.

Lifespan of Mutant flies (days) = {27, 25, 20, 25, 23, 21, 27, 25, 25, 22}

Work:

Final Answer:

2. Now imagine that, in addition to your immortal fly project, you have another selective breeding program where you are trying to breed flies that have much shorter life spans. You want to see if they are dying faster than your flies bred to have a longer life span. Use the data below to test this. Report your conclusion and explain what this means.

Lifespan of Mutant flies (days) = {27, 25, 20, 25, 23, 21, 27, 25, 25, 22}

Lifespan of Short-lived flies (days) = {24, 23, 19, 21, 22, 20, 25, 27, 21, 22}

Work:

Final Answer:

3. It just so happens that you recall an important detail about these fly experiments. It turns out that, to control for environment, the flies were assigned to live in the same cages for the duration of their lives. That is Fly 1 of the Mutant Flies and Short-lived flies lived in the same enclosure, as did Fly 2 of the Mutant Flies and Short-lived Flies, and so on. This suggests that each pair of flies had some common factors and that the samples are not actually independent. Given this information, conduct a second test of differences between the two samples. Report your conclusion and explain what this means.

Lifespan of Mutant flies (days) = {27, 25, 20, 25, 23, 21, 27, 25, 25, 22}

Lifespan of Short-lived flies (days) = {24, 23, 19, 21, 22, 20, 25, 27, 21, 22}

Work:

Final Answer: