Edhesive AP Statistics **Unit 1 – Solutions**

**Multiple Choice:** Choose the best answer choice for the following problems.

1. A SRS of 20 observations is collected from a Normal population to test against . If the t-statistic for this test is , which of the following is true?
   1. 0.0 < P-value < 0.01
   2. 0.01 < P-value < 0.025
   3. 0.025 < P-value < 0.05
   4. 0.05 < P-value < 0.25
   5. 0.25 < P-value
2. Under proper conditions, the test of versus results in a P-value of 0.015. Which of the following are true?
   1. A 95% confidence interval for will include the value 5.
   2. A 99% confidence interval will not include the value 5.
   3. A 95% confidence interval will include the value 0.
   4. A 95% confidence interval will not include the value 5.
   5. A 99% confidence interval will include the value 0.
3. A researcher is studying bacterial growth and believes she has a new petri dish formula that will increase the amount of growth in the first week by 2%. Which test design is most likely to reach significance in determining the effectiveness of the new petri dish formula?

* 1. A small random sample and a 5% significance level.
  2. A large random sample and a 5% significance level.
  3. A small random sample and a 1% significance level.
  4. A large random sample and a 1% significance level.
  5. The sample size will not affect the significance of the test.

1. The researcher from question 3 designs her experiment to have a power of 0.95 and plans to conduct the test at a significance level of . What is the probability that she commits a Type II error?
   1. 1%
   2. 5%
   3. 50%
   4. 95%
   5. 99%
2. You are designing an experiment for class in which you will gather an SRS of 25 observations from a Normal population to test against . What t statistic would mean you have achieved significance at the level?

**Free Response – Solutions**

1. The scientist discussed in questions 3&4 conducts her experiment to test the effectiveness of her new petri dish formula. She collects 25 samples and calculates an average first week growth of 23.5 with a standard deviation of 4.2. The mean first week growth using the standard formula is 22.0.
   1. Is this convincing evidence at the level that the new petri dish formula effectively increases the first week growth? Justify your answer.
   2. How would the results change if the sample mean were instead 23.4? Comment on what this means about statistical testing.