

- (12.5 points) 1. If the **sample mean** is 74, for a sample of size 17, and the **sample** standard deviation is 4.5, find the **99% confidence interval** for the population mean. (The population is normally distributed. Show calculation of maximum error.)
- (12.5 points) 2. The weights of 26 boxes of cereal are measured. The **sample standard deviation** is 0.19 ounces. The **sample mean** is 15.91 ounces. We are concerned that the mean weight of all boxes may be **under 16 ounces**.
- (a) **State** the null and alternative hypotheses.
- (b) **Test** the null hypothesis at the 5% level, using either p-value or classical approach, showing calculation of the test statistic.
- (12.5 points) 3. The weights of 25 loaves of bread are measured. The **sample standard deviation** is 0.5 ounces. We are concerned that the weights of the loaves may have a standard deviation greater than 0.4 ounces.
- (a) State the null and alternative hypotheses.
- (b) Test the null hypothesis at the 5% level, using either p-value or classical approach, showing calculation of the test statistic.
- (12.5 points) 4. In a random sample of 70 students, 42 plan to graduate next year. Find the **90% confidence interval** for the percentage of students planning to graduate next year. Show calculation of maximum error.
- (12.5 points) 5. The maximum error of the estimate is to be 0.02 in a **92% confidence interval** for the percentage. What should the **minimum sample size** be? (Assume we cannot estimate p and q.)
- (12.5 points) 6. In the year 2003, **74%** of the registered voters in Bigville actually voted in the election for mayor. This year, a survey of 80 randomly chosen registered voters, found that 68 had voted in the election for mayor. Has there been a significant **increase** in the proportion of registered voters actually voting, at the 5% level? Show calculation of the test statistic.

- (12.5 points) 7. (a) We failed to reject a null hypothesis at the 8% level in a right-tailed test, using Z, and the p-value approach. What is the comparison that would be made in the classical approach? (State exactly what is compared, with any numerical values that are involved.)
- (b) We **reject** a null hypothesis in a test using $\alpha = 7\%$.
 What would we do at the 12% level? At the 5% level?

(12.5 points) 8.

Student	Carlos	Rose	Chris	Deanna	Albert
Test One	78	70	82	92	81
Test Two	91	75	83	90	83

Test the hypothesis that there is no improvement in average score from test one to test two, based on the above sample of five students, at the 10% level of significance. Show calculation of the test statistic.

- (12.5 points) 9. One class, of 28 students, averages 75 on a test with **variance**, $s_1^2 = 26$. Another class, of 21 students, averages 78 on the same test, with $s_2^2 = 13$.
- (a) Compute the **estimated standard error** of the difference of sample means.
 (You have to identify exactly what this number is, here.)
- (b) Are the averages significantly **different** at the 10% level?
 At the 1% level? Show calculation of the test statistic. May use TI test.
 Report the df the TI gives.

- (12.5 points) 10. As in the previous problem, one class, of 28 students, averages 75 on a test with **variance**, $s_1^2 = 26$. Another class, of 21 students, averages 78 on the same test, with **variance**, $s_2^2 = 13$. Is the sample variance of the first class significantly higher than that of the second class, at the 1% level. At the 10% level? Show calculation of the test statistic.

(100 points, total.)