

1. For each question: 1) State the Null and Alternative Hypothesis in population parameters and 2) Select the correct model from the list. 3) Determine degrees of freedom for the test statistic, if possible. This question is about design only since no data will be provided. **If it is necessary to make assumption about population variances, assume equal variances.**

<p>a. A company tests for a difference in mean sales at two locations. Data is collected at each store for each month in 2012, so there are 12 pairs of measurements.</p> <p>degrees of freedom $n-1 = 11$</p> <p>$H_0: \mu_d = 0$</p> <p>$H_a: \mu_d \neq 0$</p>	<p><input type="radio"/> t-test: dependent sampling, matched pairs</p> <p>matched by months Population is months, measurements are stores</p>
<p>b. A study claims 30% of adults get news from television. You sample 1000 adults to attempt to disprove this claim.</p> <p>degrees of freedom N/A</p> <p>$H_0: p = 0.3$</p> <p>$H_a: p \neq 0.3$</p>	<p><input type="radio"/> One population, Z test of proportion</p> <p>Percentage, Y/N question</p>
<p>c. You want to support the Hypothesis that students study more than 10 hours per week. You will sample 17 students to test this claim.</p> <p>degrees of freedom $n-1 = 16$</p> <p>$H_0: \mu \leq 10$</p> <p>$H_a: \mu > 10$</p>	<p><input type="radio"/> One population, t test for mean</p>
<p>d. You sample 20 mutual funds and want to support the claim that the standard deviation is under 10.</p> <p>degrees of freedom $n-1 = 19$</p> <p>$H_0: \sigma \geq 10$</p> <p>$H_a: \sigma < 10$</p>	<p><input type="radio"/> One population, Chi-square test of variance</p>

2. (15 pts) A high school claims that boys studied less often than girls. 16 boys and 16 girls were sampled and the mean number of hours they studied in the last week was determined. Results are shown below, along with the p-values of many tests. Can you support the high school's claim at a significance level of 10%?

			Reported p-values	two tail	lower tail	upper tail
	boys	girls	F-test comparing two variances	0.7419		
mean	9.88	12.06	Pooled Variance t-test	0.1727	0.0864	0.9136
std dev	4.62	4.23	Unequal Variance t-test	0.1731	0.0865	0.9135
n	16	16	Matched Pairs t-test	0.2058	0.1029	0.8971

<p>DESIGN 1: State your Hypotheses</p> <p>Ha: The mean study time for boys is less than the mean study time for girls.</p> <p>Ho: $\mu_1 \geq \mu_2$</p> <p>Ha: $\mu_1 < \mu_2$</p>	<p>DATA: Conduct the test and circle your decision (p-values for various tests are shown above)</p> <p>p-value = 0.0864 which is less than $\alpha = 0.10$</p> <p>Reject Ho</p>
<p>DESIGN 2: State Significance Level and Decision Rule (p-value Method)</p> <p>$\alpha = 0.10$</p> <p>Reject Ho if p-value < α</p>	<p>CONCLUSION: State your overall conclusion in language that is clear, relates to the original problem and is consistent with your decision.</p> <p>The mean study time for boys is less than the mean study time for girls.</p>
<p>DESIGN 3: Determine which of these 3 models you are using. (circle one answer). Justify your reasons for choosing the model</p> <p>a. Pooled variance t-test</p> <p>Independent Sampling</p> <p>F-test p-value for comparing two variances is 0.7419 which is more than α so ok to assume $\sigma_1 = \sigma_2$</p>	