HW 8 - Math 10 Answers

For the following questions, State Ho and Ha **and** choose the correct model from this list:

a) One population, Z test for mean
b) One population, t test for mean
c) One population, Z test of proportion
d) One population, Chi-square test of variance
e) Z-test: comparing two independent population means
f) t-test: independent samples, two population pooled variance.
g) t-test: independent samples, two population unequal variance.
h) t-test: dependent sampling, matched pairs

1. You want to support the claim that male bass singers are taller than male tenor singers. 20 singers of each type will be sampled. Assume that population variances are not equal for these two groups.

   $Ho: \mu_1 \leq \mu_2 \quad Ha: \mu_1 > \mu_2$ **Model: g**

2. You want to reject the claim that no more than 10% of students will suffer financial hardship if tuition increased. 400 students will be sampled.

   $Ho: p \leq .10 \quad Ha: p > .10$ **Model: c**

3. An investor wants to reject the claim that the standard deviation for mutual fund portfolios is no more than 10. A total of 31 mutual fund portfolios will be sampled.

   $Ho: \sigma \leq 10 \quad Ha: \sigma > 10$ **Model: d**

4. A study claims people now spend, on average, more time on the Internet than they do watching television. 200 people will be asked how much time they spent on the TV and on the Internet. You want to support this claim.

   $Ho: \mu_d \leq 0 \quad Ha: \mu_d > 0$

   d = time on internet - time on TV **Model: h**

5. Is there a difference in quality between vegetables bought at farmers markets and vegetables bought at a high end grocer? Test this claim by sampling random vegetables from 20 farmers markets and 20 high end grocers. Assume that population variances are equal for these two groups.

   $Ho: \mu_1 = \mu_2 \quad Ha: \mu_1 \neq \mu_2$ **Model: f**

6. A study claims the average age for a community college student is over 27. You want to support this claim and sample 20 students.

   $Ho: \mu \leq 27 \quad Ha: \mu > 27$ **Model: b**

7. A community college district compared the number of hours students worked at an outside job at its two colleges. Design and run a test to determine if there is a significant difference in hours worked by students at the 2 colleges. Use a 1% level of significance for this test. Assume population variances are equal.

(a) (DESIGN) State your Hypothesis

$Ho: \mu_1 = \mu_2 \quad Ha: \mu_1 \neq \mu_2$

(b) (DESIGN) State Significance Level of the test and explain Type I error.

$\alpha = .01$**, the maximum probability of Type I error: we would incorrectly claim that there is a difference in mean hours worked by students at the two colleges.**

(c) (DESIGN) Determine the statistical model (test statistic) Explain your reasoning.

Model: Pooled variance t-test. This model is appropriate because there is independent sampling and we are assuming population variance are equal

(d) DESIGN) Determine decision rule (p-value method)

Reject Ho if p-value < alpha.

(e) (DATA) Conduct the test and **circle** your decision

	College A	College B
sample mean	25.57	13.86
sample std dev	11.90	11.19
sample size	14	14

Reported p-values	two tail	lower tail	upper tail
pooled variance t-test	0.012	0.006	0.994
unequal variance t-test	0.013	0.007	0.993
matched pairs t-test	0.000	0.001	0.999

Correct p-value **0.012**

Fail to Reject Ho

(f) (CONCLUSION) State your overall conclusion in language that is clear, relates to the original problem and is consistent with your decision.

There is insufficient evidence to conclude that there is a difference in mean hours worked by students at the two colleges.