PRINTABLE VERSION

Quiz 11

You scored 100 out of 100

Question 1

Your answer is CORRECT.

The average height of students at UH from an SRS of 12 students gave a standard deviation of 3.1 feet. Construct a 95% confidence interval for the standard deviation of the height of students at UH. Assume normality for the data.

a) (2.196, 5.263)

b) (7.196, 7.263)

c) (6.196, 9.263)

d) (1.196, 9.263)

e) (1.696, 6.263)

f) None of the above

$n=12$ $\quad s=3.1$

$C=0.95$

$\alpha=1-C=0.05$

$$\frac{(n-1)S^2}{\chi^2_{\alpha/2,\,n-1}} < \sigma^2 < \frac{(n-1)S^2}{\chi^2_{1-\alpha/2,\,n-1}}$$

```
> sqrt((11*(3.1)^2)/qchisq(0.05/2,11, lower.tail = F))
[1] 2.196025
> sqrt((11*(3.1)^2)/qchisq(0.05/2,11, lower.tail = T))
[1] 5.263422
>
```

Question 2

Your answer is CORRECT.

Identify the most appropriate test to use for the following situation:
In a experiment on relaxation techniques, subject's brain signals were measured before and after the relaxation exercises. We wish to determine if the relaxation exercise slowed the brain waves.

a) Matched pairs

b) One sample *t* test

c) Two sample *t* test

d) Two sample *p* test

Question 3

Your answer is CORRECT.

To use the two sample *t* procedure to perform a significance test on the difference of two means, we assume:

a) The populations' standard deviation are known.

b) ◉ The samples from each population are independent.

c) ○ The sample sizes are large.

d) ○ The distributions are exactly normal in each population.

Question 4

Your answer is CORRECT.

Solid fats are more likely to raise blood cholesterol levels than liquid fats. Suppose a nutritionist analyzed the percentage of saturated fat for a sample of 6 brands of stick margarine (solid fat) and for a sample of 6 brands of liquid margarine and obtained the following results:

$$\text{Stick}: \; [26.4, 25.8, 25.8, 25.5, 26.7, 25.7]$$
$$\text{Liquid}: \; [17.5, 16.3, 16.7, 17.3, 17.3, 16.8]$$

We want to determine if there a significant difference in the average amount of saturated fat in solid and liquid fats. What is the test statistic?

a) ○ $z = 33.883$

b) ○ $t = 22.982$

c) ○ $t = 33.383$

d) ◉ $t = 33.883$

e) ○ $z = 33.383$

```
> stick = c(26.4, 25.8, 25.8, 25.5, 26.7, 25.7)
> liquid = c(17.5, 16.3, 16.7, 17.3, 17.3, 16.8)
> t.test(stick, liquid, mu=0, alternative = "two.sided")

        Welch Two Sample t-test

data:  stick and liquid
t = 33.883, df = 9.9991, p-value = 1.188e-11
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 8.408148 9.591852
sample estimates:
mean of x mean of y
 25.98333  16.98333

>
```

Question 5

Your answer is CORRECT.

In a experiment on relaxation techniques, subject's brain signals were measured before and after the relaxation exercises with the following results:

Person	1	2	3	4	5
Before	32	37	60	51	31
After	26	35	58	49	27

$H_0: \mu_b = \mu_a$

$H_a: \mu_b > \mu_a$

Is there sufficient evidence to suggest that the relaxation exercise slowed the brain waves? (Use α=0.05)

a) ○ There is not enough information to make a conclusion.

b) ◉ Reject the null hypothesis which states there is no change in brain waves in favor of the alternate which states the brain waves slowed after relaxation.

c) ○ Fail to reject the null hypothesis which

```
> before = c(32, 37, 60, 51, 31)
> after = c(26, 35, 58, 49, 27)
> t.test(before, after, alternative="greater", paired=TRUE)

        Paired t-test

data:  before and after
t = 4, df = 4, p-value = 0.008065
```

P-value less than alpha,
so reject null hypothesis

Question 6

Your answer is CORRECT.

Location is known to affect the number, of a particular item, sold by an auto parts facility. Two different locations, A and B, are selected on an experimental basis. Location A was observed for 13 days and location B was observed for 18 days. The number of the particular items sold per day was recorded for each location. On average, location A sold 39 of these items with a sample standard deviation of 8 and location B sold 55 of these items with a sample standard deviation of 2. Does the data provide sufficient evidence to conclude that the true mean number of sales at location A is fewer than the true mean number of sales at location B at the 0.1 level of significance? Select the [Alternative Hypothesis, Value of the Test Statistic].

a) [$\mu_1 - \mu_2 > 0, t = -7.054$]

b) [$\mu_1 - \mu_2 < 0, t = -7.054$]

location a is fewer, so $\mu_1 < \mu_2$, rearranged that is $\mu_1 - \mu_2 < 0$

c) [$\mu_1 - \mu_2 = 0$, -8.186]

d) [$\mu_1 - \mu_2 \neq 0, t = -7.054$]

e) [$\mu_1 - \mu_2 \neq 0$, -0.8186]

f) None of the above

```
> pHat_pri = 655/1042
> pHat_pub = 804/1317
> (pHat_pri-pHat_pub)/sqrt(((pHat_pri*(1-pHat_pri))/1042) +
((pHat_pub *(1-pHat_pub ))/1317))
[1] 0.9008483
> 0.9008483 < 0.05
[1] FALSE
>
```

Question 7

Your answer is CORRECT.

A private and a public university are located in the same city. For the private university, 1042 alumni were surveyed and 655 said that they attended at least one class reunion. For the public university, 804 out of 1317 sampled alumni claimed they have attended at least one class reunion. Is the difference in the sample proportions statistically significant? (Use α=0.05)

a) Reject the null hypothesis which states there is no difference in the proportion of alumni that attended at least one class reunion in favor of the alternate which states there is a difference in the proportions.

b) Fail to reject the null hypothesis. There is not enough evidence to conclude that there is a difference in the proportions.

c) There is not enough information to make a conclusion.

Question 8

Your answer is CORRECT.

It has been observed that some persons who suffer acute heartburn, again suffer acute heartburn within one year of the first episode. This is due, in part, to damage from the first episode. The performance of a new drug designed to prevent a second episode is to be tested for its effectiveness in preventing a second episode. In order to do this two groups of people suffering a first episode are selected. There are 172 people in the first group and this group will be administered the new drug. There are 130 people in the second group and this group wil be administered a placebo. After one year, 12% of the first group has a second episode and 16% of the second group has a second episode. Select a 99% confidence interval for the difference in true proportion of the two groups.

a) [$-0.145, 0.065$]

```
> (0.12-0.16) + c(-1,1) * qnorm(1.99/2) * sqrt(((0.12*(1-0.12))/172) + ((0.16*(1-0.16))/130))
[1] -0.14456089  0.06456089
>
```

b) [−0.086, 0.166]

c) [−0.645, 0.565]

d) [−0.065, 0.022]

e) [−0.166, 0.086]

f) None of the above

$C = 0.99$

$n_1 = 172 \quad n_2 = 130$

$\hat{p}_1 = 0.12 \quad \hat{p}_2 = 0.16$

Question 9

Your answer is CORRECT.

We want to know if there is a ***difference between*** the mean list price of a three bedroom home, μ_3, and the mean list price of a four bedroom home, μ_4. What is the alternative hypothesis?

a) $\bar{x}_3 \neq \bar{x}_4$

b) $\mu_3 = \mu_4$

c) $\mu_3 \neq \mu_4$

d) $\mu_3 < \mu_4$

e) $\mu_3 > \mu_4$

f) $\bar{x}_3 > \bar{x}_4$

g) $\bar{x}_3 < \bar{x}_4$

h) $\bar{x}_3 = \bar{x}_4$

i) None of the above

Question 10

Your answer is CORRECT.

We want to know if there is a difference between the mean list price of a three bedroom home, μ_3, and the mean list price of a four bedroom home, μ_4, $H_0 : \mu_3 = \mu_4$ versus $H_a : \mu_3 \neq \mu_4$. Suppose we get a p-value of 0.1325, which is the proper conclusion of this test?

a) We accept the null hypothesis at 5% significance. There is extremely strong evidence of a significance difference between the mean list price of three bedroom homes and the mean list price of four bedroom homes.

b) We reject the null hypothesis at 5% significance. There is no evidence of a significance difference between the mean list price of three bedroom homes and the mean list price of four bedroom homes.

c) ◉ We fail to reject the null hypothesis at 5% significance. There is no evidence of a significance difference between the mean list price of three bedroom homes and the mean list price of four bedroom homes.

d) ○ We reject the null hypothesis at 5% significance. There is extremely strong evidence of a significance difference between the mean list price of three bedroom homes and the mean list price of four bedroom homes.

e) ○ We fail reject the null hypothesis at 5% significance. There is extremely strong evidence of a significance difference between the mean list price of three bedroom homes and the mean list price of four bedroom homes.

```
> 0.1325 < 0.05
[1] FALSE
>
```

f) ○ None of the above