

## Chapter 11 Review Answers

### 1. PHANTOMS:

- P we want to test a claim about the difference in test scores for males and females.
- H  $H_0: \mu_m = \mu_f$       $H_a: \mu_m > \mu_f$
- A we are not given that it is an SRS, so we will proceed with caution. Since  $n=416$  and  $n=386$ , we can assume approx. normal.
- N 2 sample t test
- T  $t = 37.0584$  (from calculator) \*\*you need to show the formula with numbers plugged in!
- O p value = 0 (from calculator)
- M since  $0 < .01$  we reject  $H_0$
- S we have enough evidence to reject  $H_0$  at the 1% significance level. Therefore we have enough evidence to say that the males test scores are higher than the females scores.

### 2. PANIC:

- P the parameter of interest is the true difference in test scores for males and females
- A see above
- N 2 sample t
- I [27.9106, 32.0894]     \*you need to show the formula with numbers plugged in!
- C we are 99% confident that the true difference in tests scores for males and females lies between 27.9106 and 32.0894.

1. C

2. C

3. A

4. A

5. E

6. D

### 7. PHANTOMS:

- P we want to test a claim about the difference in amino acids in meats with nitrates and meats without nitrates.

H       $H_0: \mu_N = \mu_O$        $H_a: \mu_N < \mu_O$       N=nitrates      O=no nitrates

A      we are not given that it is an SRS so we will proceed with caution. Since we know nothing about the distribution of data &  $n=30$  we will proceed with caution. Independent samples.

N      2 sample t test

T       $t = 0.7586$  (from calculator) \*\*you need to show the formula with numbers plugged in!

O      p value = 0.2256 (from calculator)

M      since  $0.2256 > .05$  we fail to reject  $H_0$

S      we do not have enough evidence to reject  $H_0$  at the 5% significance level, so we fail to reject  $H_0$ . Therefore, we do not have enough evidence to say that there is no difference in meats with nitrates and meats without.

8a.      Drivers       $\bar{x} = 0.24$        $S_x = 0.59397$

            Conductors       $\bar{x} = 0.39$        $S_x = 1.0021$

b. PANIC interval is [0.1711, 0.6089] we are 95% confident that the true mean amount of alcohol consumption by London conductors lies between 0.1711 and 0.6089.

c. PANIC again, only this time you are looking at the true difference in alcohol consumption between drivers and conductors. Interval is [-0.4776, 0.1776] we are 99% confident that the true mean difference in amount of alcohol consumption by bus drivers and London conductors lies between -0.4776 and 0.1776.

## 9. PHANTOMS:

P      we want to test a claim about the true difference between pre and post test scores.

H       $H_0: \mu = 0$        $H_a: \mu > 0$       (Post test score – pre test score)

A      we are not given that it is an SRS, we will proceed with caution. The graph of the difference in the scores is approximately symmetric with what appears to be an outlier. The center (mean) is 2.5 and the spread (standard deviation) is 2.8928. The normal probability plot appears linear. Due to the outlier, we will proceed with caution.

N      1 sample t test

T       $t = 3.8649$  (from calculator) \*\*you need to show the formula with numbers plugged in!

O      p value = 0.00005216 (from calculator)

M      since  $0.00005216 < .05$  we reject  $H_0$

S      we have enough evidence to reject  $H_0$  at the 5% significance level. Therefore we have enough evidence to say that there is a difference in listening skills between the pre and post tests.

1. C
2. B
3. D
4. B

### 1. Yogurt problem

Put Strawberry into List1 and Vanilla into List 2. I worked with List 3 = Strawberry – Vanilla.

- P We want to test a claim about the true difference in calories between servings of strawberry and vanilla yogurt.
- H  $H_0: \mu=0$   $H_a: \mu \neq 0$
- A SRS? Proceed with caution. The boxplot for the difference in calories appears skewed right with a possible outlier at 100. The center (median) is 0 and the spread (IQR) is 50. The Normal Probability Plot appears nonlinear. Proceed with caution.
- N One sample t test (Matched pairs t test)
- T  $t = 1.5839$
- O P value = 0.1443
- M since 0.1443 is not less than 0.05, we fail to reject  $H_0$  at the 5% significance level. Therefore, we do not have enough evidence to say that there is a difference in calories between servings of strawberry and vanilla yogurt.

### 2. Cholesterol problem

- P Our parameter of interest is the true difference between the mean levels of cholesterol with the drug and with the placebo.
- A everything is fine
- N 2 sample t interval
- I I did drug – placebo and got (-0.4607, 12.861)
- C we are 90% confident that the true difference between the mean levels with the drug and with placebo lies between -0.4607 and 12.861 mg/dL.