

## SOC510 Homework #9: Chapter 19

Due November 18 (Thursday)

1. Many students have complained that the soft-drink vending machine A (in the Union) dispenses a different amount of drink than machine B (in the Wescoe Hall). To test this belief, a student randomly sampled several servings from each machine and carefully measured them, with the results as follows:

Machine	Number	Mean	St.Dev.
A	10	5.38	1.59
B	12	5.92	0.83

- (a) Estimate 95% confidence interval of  $\mu_A - \mu_B$
  - (b) Do hypothesis test at  $\alpha = .05$   
 $H_0 : \mu_A = \mu_B$   
 $H_a : \mu_A \neq \mu_B$
  - (c) Do hypothesis test at  $\alpha = .05$   
 $H_0 : \mu_A \leq \mu_B$   
 $H_a : \mu_A > \mu_B$
  - (d) Do hypothesis test at  $\alpha = .05$   
 $H_0 : \mu_A \geq \mu_B$   
 $H_a : \mu_A < \mu_B$
2. The heights (measured in inches) of 20 randomly selected women and 30 randomly selected men were independently obtained from the KU students in order to estimate the difference in their mean heights.

Gender	Number	Mean	St.Dev.
Female(f)	20	63.8	2.18
Male(m)	30	69.8	1.92

- (a) Estimate 95% confidence interval of  $\mu_m - \mu_f$
  - (b) Do hypothesis test at  $\alpha = .10$   
 $H_0 : \mu_m = \mu_f$   
 $H_a : \mu_m \neq \mu_f$
  - (c) Do hypothesis test at  $\alpha = .02$   
 $H_0 : \mu_m \leq \mu_f$   
 $H_a : \mu_m > \mu_f$
3. Do hypothesis test at  $\alpha = .01$  using 19.31 on p.483 ( $H_a : \mu_{\text{boy}} \neq \mu_{\text{girl}}$ ).
  4. Do hypothesis test at  $\alpha = .05$  using 19.34 on p.484 ( $H_a : \mu_{\text{men}} < \mu_{\text{women}}$ ).
  5. Estimate 90% confidence interval using 19.39 on p.486

6. **Extra Credit – 4 points** (no extra points for late submission)

Suppose that we are interested in comparing the academic success of college students who belong to fraternal organizations with the academic success of those who do not belong to fraternal organizations. The reason for the comparison centers on the recent concern that the fraternity members, on the average, are achieving at a lower academic level than nonfraternal students achieve.

Sample	Number	Mean	St.Dev.
Fraternity members (f)	25	2.03	0.58
Nonmembers (n)	30	2.21	0.49

Complete a hypothesis test using  $\alpha = .05$ .