**POLS 095 Homework 3 Conceptual Questions Answer Key**

1. Calculate the standard error and 95% confidence interval *(5 points each; 10 total)*

A. 0.40.   
Calculation: Standard deviation of sample equals 1.534.   
Standard error of sample mean = st. dev/√𝑛 = 1.53/√15 = 0.40.

B. (1.13, 2.73)   
Calculation: Using ±2 shortcut, the 95 percent CI for mean is 1.93 ± (2∗0.40) = 1.93 ± 0.80.

2. Calculate the standard error and 95% confidence interval *(5 points each; 10 total)*

A. 0.07.   
Calculation: Standard error of sample mean = st. dev/√𝑛 = 1.98/√816 = 0.07.

B. (1.67, 1.95).   
Calculation: Using ±2 shortcut, the 95 percent CI for mean is 1.81 ± (2∗0.07) = 1.81 ± 0.14.

3. Calculate the standard error, 95 percent confidence interval, and explain the finding. *(5 points each; 15 points total)*

A. 0.20.   
The standard error is the sample standard deviation divided by the square root of the sample size: 4/20 = 0.20.

B. 5.6 to 6.4.   
The 95 percent confidence interval of the sample mean, by the shortcut rule:   
6 ± 2(0.20) = *5.6 to 6.4*.

C. Yes, you can infer that individuals perceive a greater gender difference than actually exists. Ninety-five percent of all possible samples will perceive a gender height difference of between 5.6 inches and 6.4 inches. Only 2.5 percent of all possible samples will perceive a height difference of less than 5.6 inches. Since the true gender difference in population, 5 inches, lies below the lower confidence boundary of 5.6, then we can infer that most people perceive a greater height difference than actually exists.

4. *(A and B, 5 points each, C= 10 points; 25 points total)*

A.

Standard error = .8 miles per hour. The standard error of the sample mean equals the sample standard deviation (s) divided by the square root of the sample size (100): 8/√100 = 0*.8*.

1. The 95 percent confidence interval = 45.4 to 48.6 miles per hour. By shortcut: 47 ± 2(0.8) = *45.4 to 48.6* miles per hour.

C.

(i) No, the skeptical commissioner’s claim can be rejected.

(ii) The commissioner’s hypothetical population mean, 50, lies beyond the upper boundary of the 95 percent confidence interval, 48.6. There is a probability of less than .05— more precisely, less than 0.025—that the true population mean lies above 48.6. Students may calculate the exact value of *Z* or *t*: (50 – 47)/0.8 = 3.75.