Pledge:

9/30/2005 MATH271 – Applied Statistics Name: Solution
Dr. Lunsford Quiz 4 20 Points Total

Clearly indicate all variable values and calculator input and please give your answers using complete English sentences.

I. The average time it takes a population of adults to complete a certain achievement test is 46.2 minutes. The standard deviation is 8 minutes. Assume the "time to complete the test" variable is normally distributed. Please answer the following: (4 points each – 8 total)

(a) How likely is it that a randomly selected individual from this population will complete the test in less than 43 minutes? normalcdf(-1E99, 43, 46.2, 8) = .3446
There is a 34.5% chance that a randomly selected individual from this population will complete the test in less than 43 minutes.

(b) If 50 of these adults were randomly selected, how likely would it be that the *average* time for this group to complete the test would be less than 43 minutes? $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{8}{\sqrt{50}} \approx 1.1314$
$\mu_{\bar{x}} = \mu = 46.2$. normalcdf(-1E99, 43, 46.2, 1.1314) = .00233.
There is a 0.23% chance (less than a 1% chance!) that the average for this group will be less than 43 minutes.

II. A random sample of reading scores of 100 fifth-graders from the southeastern United States has a mean of 82 and a standard deviation of 15. Please answer the following: (12 points total)

(a) What is a point estimate for the average reading score for all fifth-graders in the southeastern United States? (2 points)
A point estimate for μ is $\bar{x}$. In this case a point estimate for the mean reading score for all 5th graders is 82.

(b) You would like to find an interval estimate for the average reading score for all fifth-graders from the southeastern United States. What type of interval estimate will you use and why? (3 points)
Since σ is unknown, I will use a t-interval (even though n is large*). However since n is large we could also use a z-interval with σ replaced by s.

(c) Find a 95% confidence interval for the average reading score for all fifth-graders from the southeastern United States. Clearly indicate what variables/parameters the values you are given above represent. (4 points)
t-interval: $\bar{x}=82$, $s=15$, $n=100$, C-level = .95
The confidence interval is (79.024, 84.976),
i.e., $79.024 < \mu < 84.976$

(d) Write a short sentence describing the meaning of your result in part (c) above. (3 points)
We are 95% confident that the average reading score for all 5th graders from the southeastern United States is between 79.024 and 84.976.

* t-interval is exact if the population variable is normal and for large n is approximately correct if the population is not normal.