

Pledge:

4/8/2005  
Dr. Lunsford

MATH 171  
Quiz 7

Name: \_\_\_\_\_  
0 Points Possible

I. According to the ACT Research Service, the national average ACT Science score for the year 2000 was  $\mu = 21$  with a standard deviation of  $\sigma = 4.5$ . Suppose 20 students who took the ACT that year are randomly chosen and their average ACT score,  $\bar{x}$ , is computed. What is the probability that this *average score* will be greater than 23? Please show how you compute this probability (either with your calculator or by hand) and write the associated probability statement (i.e.  $P(???) = ???$ ). (4 points)

II. The supervisor of a local school district wants to compare the average ACT Science score of the students in her district to the national average given above. To do this, she randomly selects 20 students from her district and finds their average ACT Score is 23.55. Assume that ACT Science scores in this district are “approximately normally” distributed. Please answer the following:

(a) Find a 95% confidence interval for the local school district’s average ACT Science score. Assume that the school district’s standard deviation of ACT Science scores is the same as the national standard deviation. Clearly indicate what type of interval you are finding and why, what values you plug into your calculator, and your answer. (4 points)

(b) Use the answer you computed above to write a probability statement (i.e.  $P(???) = ???$ ) and an English statement describing your results in the context of this problem. (3 points)

(c) How large of a sample size would the supervisor need to use to be 95% confident that her estimate of the district average does not have an error of more than 1.5 points? Clearly show your work. (3 points)

(d) Based on your above, do you think the supervisor could claim that the students in her district have a higher average ACT Science score than the national average? Why or why not? (2 points)

(e) Now assume that the standard deviation of ACT Science scores in the supervisor’s district is not known and that the standard deviation of the 20 randomly selected students ACT Science scores was 3.694. Again compute a 95% confidence interval for the local school district’s average ACT Science score. Clearly indicate what type of interval you are finding and why, what values you plug into your calculator, and your answer. (4 points)