Department of Industrial Engineering & Operations Research

IEOR 165 (Spring 2017)

Homework 4

Due: Thursday, April 20

Question 1. A normal population distribution is known to have standard deviation 25. Determine the p-value of a test of the hypothesis that the population mean is equal to 40, if the average of a sample of 49 observations is
(a) 42.5; **(b)** 45.0; **(c)** 47.5.

Question 2. The mean breaking strength of a certain type of fiber is required to be at least 190 psi. Past experience indicates that the standard deviation of breaking strength is 5 psi. If a sample of 8 pieces of fiber yielded breakage at the following pressures,

189.92, 191.72, 181.32, 200.20, 183.03, 187.79

would you conclude, at the 5 percent level of significance, that the fiber is unacceptable? What about at the 10 percent level of significance?

Question 3. Twenty years ago, entering male high school students of Central High could do an average of 20 pushups in 60 seconds. To see whether this remains true today, a random sample of 29 freshmen was chosen. If their average was 22.5 with a sample standard deviation of 4.5, can we conclude that the mean is no longer equal to 20? Use the 5 percent level of significance.

Question 4. Last year it was found that on average it took graduate students 20mins to fill out the forms required for graduation. This year the department has changed the form and asked graduating student to report how much time it took them to complete the forms. Of the students 22 replied with their time, the average time that they reported was 18.5 mins, and the sample standard deviation was 5.2. Can we conclude that the new forms take less time to complete then the older forms? Use a 10 percent significance level.