

1. Nine men with a genetic condition that causes obesity entered a weight reduction program. After four months the statistics of weight loss were: mean = 11.2 with S.D. = 9.0. The researcher wants to test the hypothesis that “The average four-month weight loss in such a program is  $\leq 6$  pounds” at 5% significance level.
2. A sample of 360 owners of retail service and business firms that had gone into bankruptcy, 110 reported having no professional assistance prior to opening the business. Test the null hypothesis that at most 30% of all members of this population had no professional assistance before opening the business at 5% significant level.
3. A city health department wishes to determine if the mean bacteria count per unit volume of water at a lake beach is within the safety level of 250. A researcher collected 10 water samples of unit volume and found the bacteria count to be: 170, 190, 205, 199, 180, 207, 210, 199, 196, and 180. Does the data indicate that the bacteria count is within the safety level? Test at the 1% level of significance.
4. A Drug Company X develops a new drug, designed to prevent colds. The company states that the drug is equally effective for men and women. To test this claim, they choose a simple random sample of 100 women and 200 men from a population of 100,000 volunteers. At the end of the study, 38% of the women caught a cold; and 51% of the men caught a cold. Based on these findings, can we reject the company's at 5% level of significance?
5. A company manufactures rope, from a large number of tests over a long period of time, they have found a mean breaking strength of 300 lbs and a standard deviation of 24 lbs.  
It is believed that by a newly developed process, the mean breaking strength is increased.  
Design a decision rule rejecting old process at 1% level of significance if it is agreed to test 64 ropes.
6. Forty-nine American soldiers, observed at random, yield a mean weight of 160 pounds with a standard deviation (s) of 11 pounds. Are these observations consistent with the assumption that the mean weight of all American soldiers is 170 pounds?
7. The Acme Company has developed a new battery. The engineer in charge claims that the new battery will operate continuously for *at least* 9 minutes longer than the old battery.  
The company selects a simple random sample of 200 new batteries and 200 old batteries. The old batteries run continuously for 180 minutes with a standard deviation of 30 minutes; the new batteries, 100 minutes with a standard deviation of 30 minutes. Test the engineer's claim that the new batteries run at least 9 minutes longer than the old. Use a 0.05 level of significance.
8. The Department of Transportation did a study a number of years ago that showed that the proportion of cars tested which failed to meet the state pollution standard was 40%. The department would like to be able to say that the cars have improved since then. In a sample of 200 cars more recently, the proportion not meeting the standards was 42%. Are the cars better at meeting the standards than they used to be? Use 1% level of significant.