

Chapter 7 Examples

1. Example #1:

A research meteorologist has been studying wind patterns over the Pacific Ocean. Based on these studies, a new route is proposed for commercial airlines going from San Francisco to Honolulu. The new route is intended to reduce flying time by taking advantage of existing wind patterns. It is known that for the old route, the distribution of flying times for a large, four-engine jet has a mean of $\mu = 5.25$ hrs with a standard deviation of 0.6 hours. What null and alternative hypotheses should you use in order to determine if the new route has decreased the average flying time?

2. Example #2:

At a particular state university, the entering students recently have averaged a score of 1000 on their SATs with a standard deviation of 180. Suppose you wish to see if this year's applying students have a different mean SAT score. What null and alternative hypotheses should you use?

3. Example #3:

Last year, your company's service technicians took an average of 2.6 hours to respond to trouble calls from business customers who had purchased service contracts. What null and alternative hypotheses should you test in order to answer the question, "Does this year's data show a significantly different average response time?"

4. Example #4: What are possible Type I and Type II errors for the situation described in Example 1?

5. Example #5:

The Wall Street Journal reported that the average assembly time for the Ford Taurus is $\mu = 38$ hours. A modification to the assembly procedure has been made. It is thought that the average assembly time may be reduced because of this modification. A random sample of 47 new Ford Taurus automobiles coming off the assembly line showed the average assembly time to be $\bar{x} = 37.5$ hours. The population has a standard deviation of 1.2 hours. Suppose we are interested in testing whether this indicates that the average assembly time has been reduced. Carry out the appropriate hypothesis test using a 5% level of significance.

6. Example #6:

A random sample of 68 adult coyotes in a region of northern Minnesota showed the average age to be $\bar{x} = 2.05$ years with a sample standard deviation of 0.82 years. However, the overall average age of adult coyotes is 1.75 years. Carry out the appropriate hypothesis test to determine if the sample data indicates that coyotes in this region of northern Minnesota tend to live longer than the average adult coyote using $\alpha = .01$.

7. Example #7:

A tire company has found that the mean time required for a mechanic to replace a set of four tires is 18 minutes with a standard deviation of 2 minutes. The company wishes to determine if instituting a new installation procedure will reduce the mean installation time. Carry out the above hypothesis test on a random sample of 40 installations. Assume this sample yielded a mean installation time of 17.4 minutes.