STATISTICS FOR ECONOMISTS

Class Exercise 4.

These questions are about testing hypotheses about a single population parameter – mean or proportion and for large and small samples. To test yourselves a bit, try using different significance levels or change the sample size, or see what happens if you specify the alternative as a one or two tailed test. See Barrow chapter 5 for more examples.

1. Given the two hypotheses

    H_0: $\mu=400$

    H_1: $\mu=415$

    and $\sigma^2 =1000$ for each hypotheses.

Sketch the distribution of the sample mean under both hypotheses.

2. Given the following sample data:

    $\bar{x} =15$, $s^2=270$ and n=30

    test the null hypothesis that the true mean is equal to 12, against a two-sided alternative hypothesis. Draw the distribution of $\bar{x}$ under the null hypothesis and indicate the rejection regions for this test.

3. Testing the null hypothesis that $\mu=10$ against $\mu>10$, a researcher obtains a sample mean of 12 with standard deviation of 6 from a sample of 30 observations. Does the researcher reject the null?

4. The researcher in question 3 repeats the analysis with a sample of 15 observations, with the same mean and standard deviation. How does her conclusion change, if at all?

5. From experience it is known that a certain brand of tyres lasts on average 15000 miles with standard deviation 1250. A new compound is tried and a sample of 120 tyres yields an average life of 15150 miles. Are the new tyres an improvement? Use a 5% significance level.

6. Test H_0: $\pi=0.5$ against H_1: $\pi \neq 0.5$ using p=0.45 from a sample of size n=35.