M E 345

Lecture 14

Today, we will:

- Do some review example problems hypothesis testing (one sample)
- Review the pdf module: Two Samples Hypothesis Testing and do some examples

Example: Hypothesis testing

Given: A manufacturer claims that a plastic part is *at least* 6.00 cm long. You test the claim by performing a hypothesis test. You pick 30 parts at random from the assembly line, and carefully measure the length of each one. You calculate $\bar{x} = 6.053$ cm and S = 0.104 cm.

To do: To what confidence level (%) can we claim that the manufacturer's claim is true? **Solution**:



Example: Hypothesis testing

Given: We buy a gadget that is supposed to increase the gas mileage of our car. We take 6 trips *without* the gadget and 6 (nearly identical) trips *with* the gadget. The results:

| x_A (mpg without gadget) | x_B (mpg with gadget) | |
|----------------------------|-------------------------|--|
| 25.6 | 26.2 | |
| 27.3 | 27.1 | |
| 24.2 | 24.1 | |
| 28.7 | 29.2 | |
| 23.6 | 24.5 | |
| 25.1 | 24.9 | |

To do: Determine if there is a statistically significant improvement (increase) in gas mileage.

Solution:



Example: Hypothesis testing

Given: [Continuation of previous example] We buy a gadget that is supposed to increase the gas mileage of our car. We take 6 trips *without* the gadget and 8 trips *with* the gadget. We do not attempt to pair up the tests. The results:

| x_A (mpg without gadget) | x_B (mpg with gadget) |
|----------------------------|-------------------------|
| 25.6 | 26.2 |
| 27.3 | 27.1 |
| 24.2 | 24.1 |
| 28.7 | 29.2 |
| 23.6 | 24.5 |
| 25.1 | 24.9 |
| | 26.5 |
| | 25.8 |

To do: Determine if there is a statistically significant improvement (increase) in gas mileage.

Solution: