

Math Stat 465

Hypothesis Testing with a Continuous Distribution – An Example

A company produces 2 lb. cans of coffee. The actual net weight of coffee in each can is variable and so might not equal 2 lbs. The company is concerned about underfill, and will stop production and adjust its machinery if there is evidence that cans are being underfilled.

Denote the true mean net weight by μ .

1. The company would rather not stop production, which is costly, but will do so if the evidence of underfill is strong. Thus, there are two assumptions:

H : The process is in control (no underfill).

H : The process has slipped (cans are being underfilled).

Label these H_0 or H_a , and rewrite them as statements about μ .

2. Suppose the net weight of a can is modeled as a random variable with a $N(\mu, \sigma^2)$ distribution, and that we know $\sigma = .1$ lb. The company decides to test for underfill by taking a random sample of $n = 16$ cans and to stop the process if $\bar{X} < 1.9589$ lbs.

(a) Find α (= probability of a type I error)

(b) Find β (= probability of a type II error) when $\mu = 1.98$ lbs.

(c) Find β when $\mu = 1.95$ lbs.

(d) Find β when $\mu = 1.90$ lbs.