Statistics

Lecture 51

Feb 19-8:47 AM

Dept. claims that at most 30% of all students have used the tutoring lab. $p \le .3$

I surveyed 80 students and 34% of them had used the tutoring lab. $n = 80$, $\hat{p} = .34$

Use $\alpha = .01$ to test the claim.

$x = n\hat{p}$

if decimal → Round up

$x = 80(.34) = 27.2$

$x \approx 28$

$H_0: p \le .3$ claim

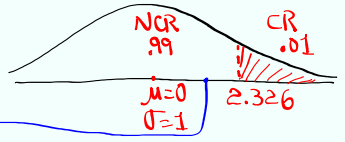
$H_1: p > .3$ RTT

CV Z invNorm

RTT $\alpha = .01$

CTS $Z = .976$

P-Value $P = .165$



$Z = \text{invNorm}(.99, 0, 1)$

1-PropZTest

$P_0: .3$ H_0

$x = 28$

$n = 80$

Prop > P_0 H_1

CTS is in NCR ⇒ H_0 valid

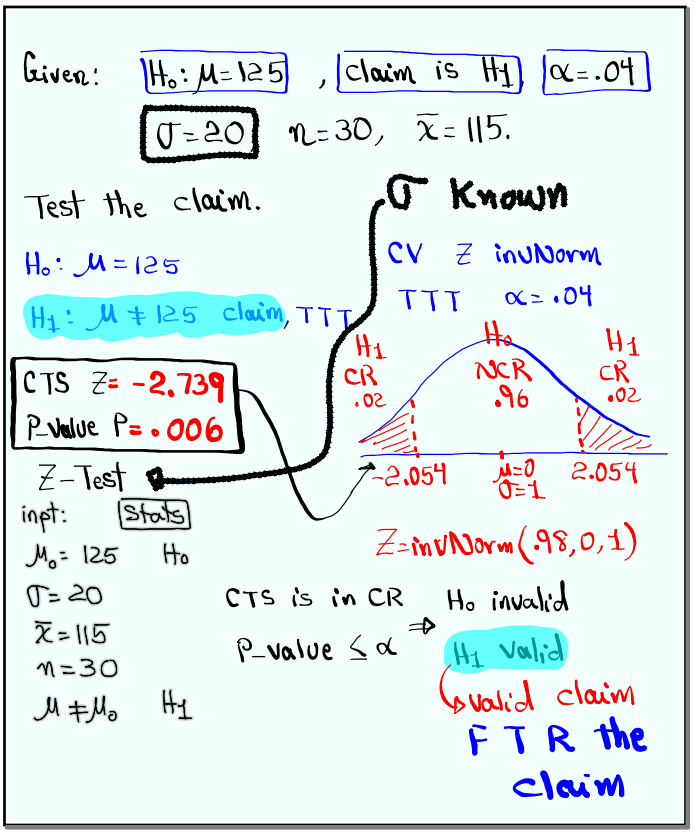
P-Value > α

H_1 invalid

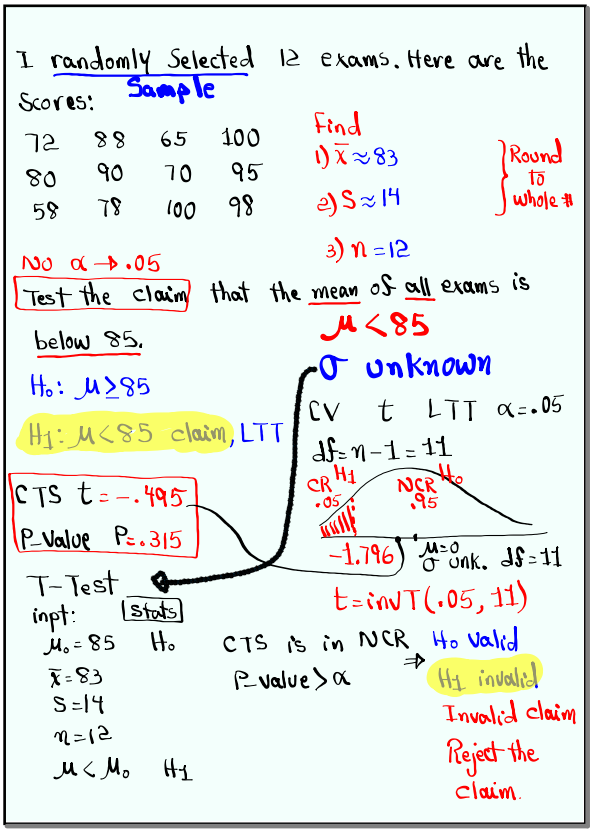
Valid claim

FTR the claim

Dec 4-8:52 AM



Dec 4-9:03 AM



Dec 4-9:15 AM

The department claims that standard deviation of scores of all exams is 10.

Use $\alpha = .1$ to test the claim.

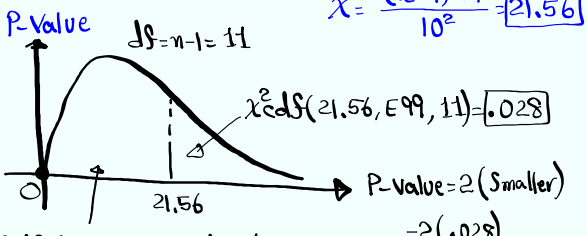
$H_0: \sigma = 10$ claim

$H_1: \sigma \neq 10$ TTT

P-Value Method only.

CTS $\chi^2 = \frac{(n-1)\cdot s^2}{\sigma^2}$

$\chi^2 = \frac{(12-1)\cdot 14^2}{10^2} = 21.56$



χ^2cdf(0, 21.56, 11) = .972

$= 2(.028)$

$= .056$

P-Value $\leq \alpha$ → H_0 invalid, H_1 valid → Invalid claim → Reject the claim

.056 .1

If we change α to .05, .04, .03, .02, or .01

P-Value $> \alpha$ → H_0 valid, H_1 invalid → valid claim → FTR the claim.

Dec 4-9:29 AM

Female nurses: $n = 10$, $\bar{x} = 48$, $S = 8$.

Male nurses: $n = 12$, $\bar{x} = 40$, $S = 12$.

Use $\alpha = .02$ to test the claim that two Pop. Standard deviations are the same.

$H_0: \sigma_1 = \sigma_2$ claim

$H_1: \sigma_1 \neq \sigma_2$ TTT

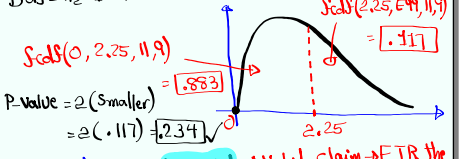
Male	Female
$n_1 = 12$	$n_2 = 10$
$S_1 = 12$	$S_2 = 8$

$S_1 > S_2$

Ndf = $n_1 - 1 = 11$

Ddf = $n_2 - 1 = 9$

CTS $F = \frac{S_1^2}{S_2^2} = \frac{12^2}{8^2} = 2.25$ ✓



P-value = 2(Smaller) = 2(.117) = .234 ✓

P-Value $> \alpha$ → H_0 valid, H_1 invalid → valid claim → FTR the claim

.234 .02

Use 2-SampF Test to verify these answers

2-SampF Test

Inpt: Stats

$S_1 = 12$

$n_1 = 12$

$S_2 = 8$

$n_2 = 10$

$\sigma_1 \neq \sigma_2$ H_1

CTS $F = 2.25$

P-value $P = .234$

Dec 4-9:42 AM