Statistics

Lecture 49

Feb 19-8:47 AM

The College claims that at most 30% of all Students love online classes. $P \le .3$

I took a Survey of 150 Students and 34% of them were in love with online classes. $n = 150$, $\hat{P}$

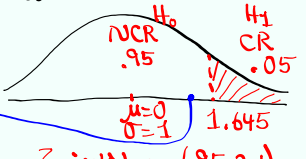
Test the claim. $x = n\hat{p} = 150(.34) = 51$

$H_0: P \le .3$ claim

$H_1: P > .3$ RTT

CV Z invNorm

No $\alpha \rightarrow \alpha = .05$ RTT



$Z = \text{invNorm}(.95, 0, 1)$

CTS $Z = 1.069$

P-value $P = .143$

1-Prop Z Test

$P_0: .3$ H_0

$x = 51$

$n = 150$

Prop > P_0 H_1

CTS is in NCR H_0 valid, H_1 invalid

P-value > α

Valid claim

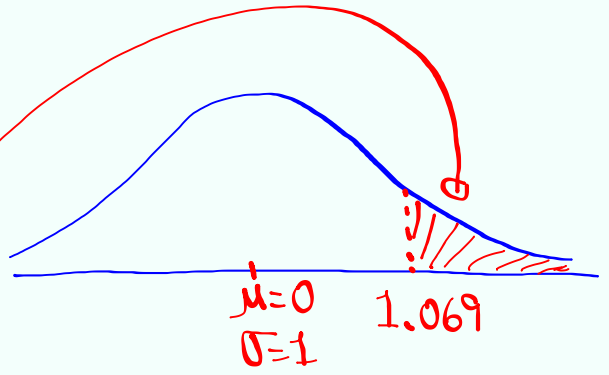
FTR the claim

Dec 2-8:53 AM

CTS $Z = 1.069$

RTT

find p-value



normalcdf(1.069, E99, 0, 1)

$= .143$

If it was TTT, P-value $= 2(.143) = .286$

Dec 2-9:04 AM

$\mu < 500$

The college claims the mean weekly income for all students is below \$500.

$n = 24$

I took a sample of 24 students, their mean weekly income was \$475 with standard deviation of \$80.

$n = 24$, $\bar{x} = 475$, $S = 80$

Test the claim at $\alpha = .1$. σ unknown

H_0: $\mu \geq 500$ CV t LTT invT

H_1: $\mu < 500$ claim, LTT $df = n - 1 = 23$ $\alpha = .1$

CTS $t = -1.531$

P-value $P = .070$ ✓

T-Test

input: Stats

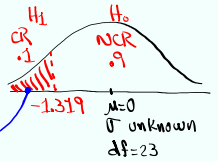
$\mu_0 = 500$ H_0

$\bar{x} = 475$

$S = 80$

$n = 24$

$\mu < \mu_0$ H_1



$t = invT(.1, 23)$

CTS is in CR. H_0 invalid H_1 valid

P-value $\leq \alpha$

.07 .1

valid claim

FTR the claim

If we choose α to be .06, .05, .04, .03, .02, .01 ⇒ P-value $> \alpha$

H_0 valid, H_1 invalid

Reject the claim ⇒ Invalid claim

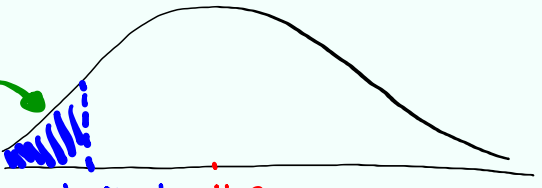
Dec 2-9:07 AM

CTS $t = -1.531$

$df = 23$

LTT

find P-Value



σ unknown

$df = 23$

$tcdf(-E99, -1.531, 23)$

$= .070$

If it was TTT → P-value $= 2(.070)$

$= .140$

Dec 2-9:23 AM

The College claims the Standard deviation of ages of all Students is not 8 Yrs. $\sigma \neq 8$

I took a Sample of 12 Students, the Standard deviation of their ages was 10. $n = 12$, $S = 10$

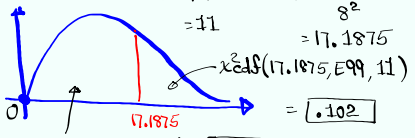
Use $\alpha = .02$ to test the claim.

$H_0: \sigma = 8$

$H_1: \sigma \neq 8$ claim, TTT

CTS $\chi^2 = \frac{(n-1)\cdot s^2}{\sigma^2} = \frac{(12-1)\cdot 10^2}{8^2} = 17.1875$

P-Value $df = n-1 = 11$



$\chi^2cdf(17.1875, E99, 11) = .102$

$\chi^2cdf(0, 17.1875, 11) = .898$

P-value = 2 · Smaller $= 2(.102) = .204$

P-value α

$.204 > .02$

H_0 valid

H_1 invalid → Invalid claim → Reject the claim

Work on SA 24-27

Dec 2-9:27 AM