Statistics

Lecture 24

Feb 19-8:47 AM

SG 24

Testing One population Proportion:

1) $H_0: P = P_0$ $H_1: P \neq P_0$ TTT | $H_0: P \leq P_0$ $H_1: P > P_0$ RTT | $H_0: P \geq P_0$ $H_1: P < P_0$ LTT

Always identify the claim & type of testing

2) Find all Critical Values

Drawing, labeling, Shading, Full TI Command needed. Use invNorm.

3) Find Computed Test statistics CTS and P-Value P.

Use TI Command 1-PropZTest

4) We use the testing chart to determine the validity of H_0 & H_1.

H_0 valid $\Leftrightarrow$ H_1 invalid

H_0 invalid $\Leftrightarrow$ H_1 valid

5) Draw Final Conclusion about the claim.

Reject the claim when claim is invalid OR FTR the claim when claim is valid.

May 14-1:51 PM

College claims that 10% of all students smoke. $P = .1$ ← H_0

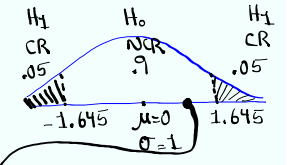
I surveyed 250 students and 30 of them were smokers. $n = 250$ $x = 30$

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

H_0: $P = .1$ claim

H_1: $P \neq .1$ TTT

CV Z TTT $\alpha = .1$



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

CTS Z

P-Value P

1-Prop Z Test

$P_0 : .1$ H_0

$x = 30$

$n = 250$

Prop ≠ P_0 H_1

Calculate

CTS Z = 1.054

P-Value P = .292

CTS is in NCR.

H_0 Valid → Valid claim

H_1 invalid FTR the claim

P-Value .292 > α .1

H_0 Valid, H_1 invalid

Valid claim → FTR the claim

May 14-2:02 PM

CNN claims that at most 45% of all voters are in favor of term limits for politicians. $P \leq .45$ ← H_0

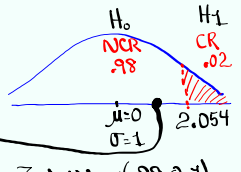
I surveyed 750 voters, and 48% of them were in favor of term limits. $n = 750$ $x = .48(750) = 360$

Test the claim using $\alpha = .02$

H_0: $P \leq .45$ claim

H_1: $P > .45$ RTT

CV Z RTT $\alpha = .02$



$Z = \text{invNorm}(.98, 0, 1)$

CTS Z = 1.651

P-Value P = .049

1-Prop Z Test

$P_0 : .45$ H_0

$x : 360$

$n : 750$

Prop > P_0 H_1

Calculate

CTS is in NCR

H_0 Valid → Valid claim

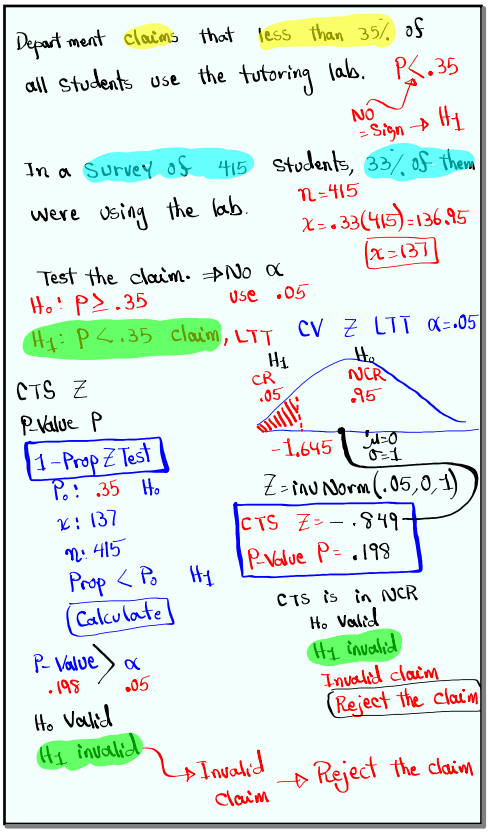
H_1 invalid FTR the claim

P-Value .049 > α .02

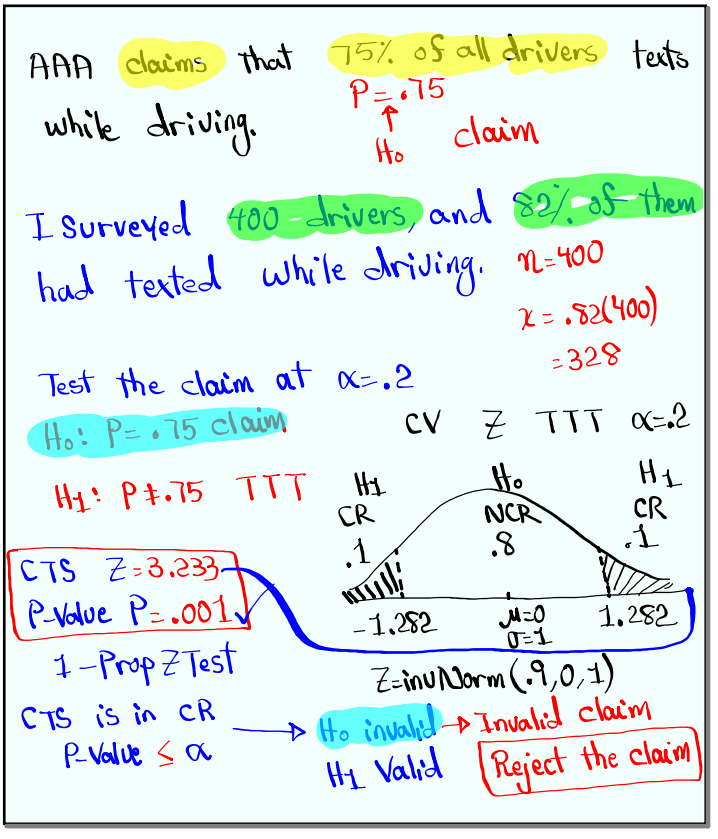
H_0 Valid → Valid claim

H_1 invalid. FTR the claim

May 14-2:19 PM



May 14-2:35 PM



May 14-2:52 PM

College claims that more than 70% of all students are in favor of in-Person classes.

$p > .7$ ← H_1 (no = sign)

A survey of 570 students, 68% of them were fan of in-person classes.

$n = 570$

$x = .68(570)$

$= 387.6$

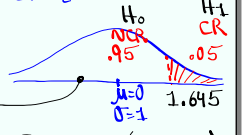
$\bar{x} = 388$

Test the claim. no $\alpha \rightarrow .05$

$H_0: p \leq .7$

$H_1: p > .7$ claim, RTT

CV Z RTT $\alpha = .05$



CTS $Z = -1.005$

P-Value $P = .8493$

1-Prop ZTest

$p_0: .7$

$x = 388$

$n = 570$

Prop > p_0

Calculate

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

CTS is in NCR

P-Value > α

H_0 valid

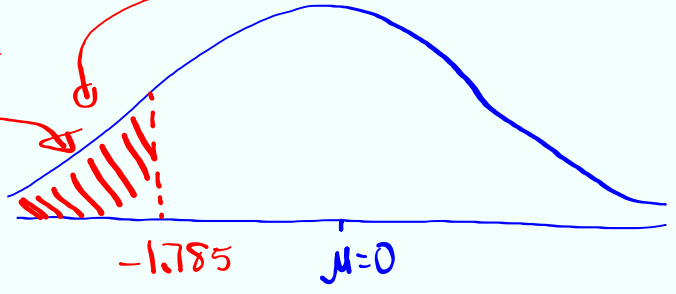
H_1 invalid ⇒ Invalid claim

Reject the claim

May 14-3:09 PM

Given CTS $Z = -1.785$, LTT

Find p-value.



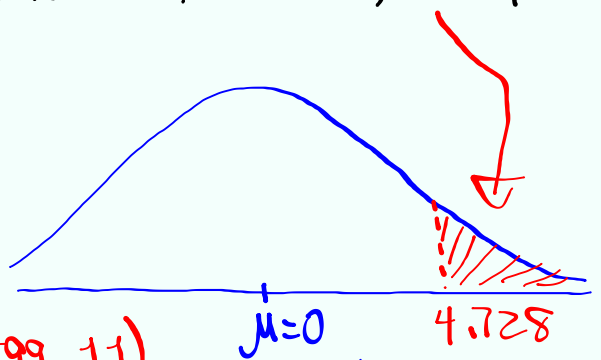
normalcdf $(-E99, -1.785, 0, 1) = .037$

If it was TTT ⇒ $2(.037) = .074$

May 14-3:23 PM

Given CTS $t = 4.728$, $df = 11$, RTT

Find P-value



$tcdf(4.728, E99, 11)$

$= 3.1 \times 10^{-4}$

$\mu = 0$
σ unknown
$df = 11$

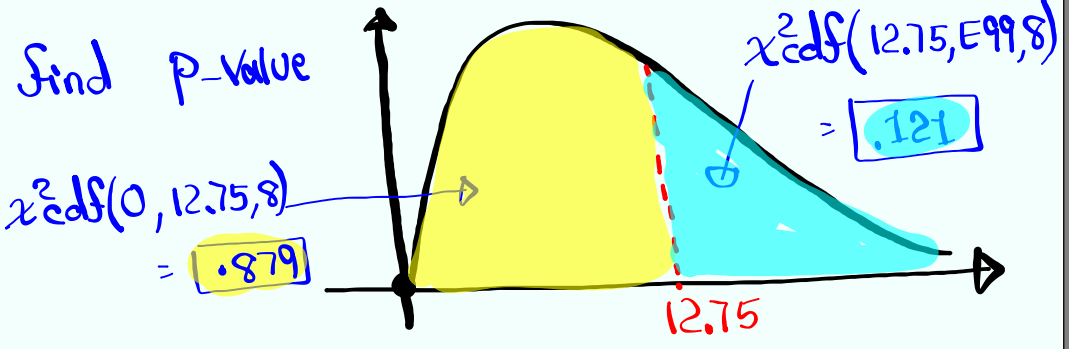
If it was TTT $\Rightarrow$ $2(3.1 \times 10^{-4})$

6.2×10^{-4}

May 14-3:28 PM

Given CTS $\chi^2 = 12.75$, $df = 8$, TTT.

Find P-value



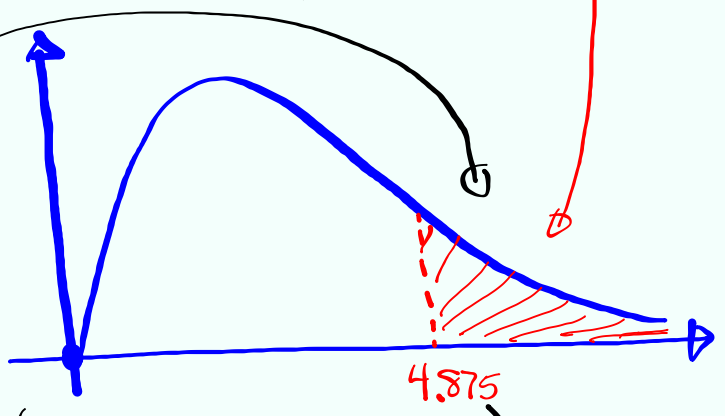
P-value = 2 • Smaller area

$= 2(.121) = .242$

May 14-3:32 PM

CTS $F = 4.875$ $Ndf = 5$, $Ddf = 25$ RTT

Find P-Value.



$\rightarrow$ fcdf(4.875, E99, 5, 25)

$\approx$ .003

May 14-3:37 PM

doing reverse

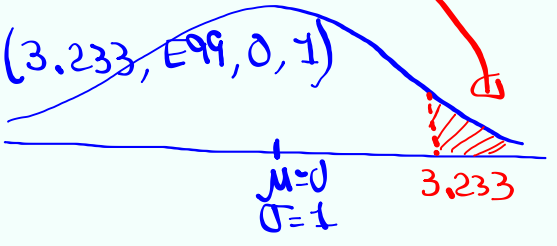
CTS $Z = 3.233$ TTT

Find P-Value

P-Value = 2 • Area

P-Value = 2 * normalcdf(3.233, E99, 0, 1)

= .001



May 14-3:06 PM