Statistics

Lecture 48

Feb 19-8:47 AM

CNN claims that at most 35% of all voters voted by Party recommendation. $P \leq .35$

I took a survey of 240 voters and 38% of them voted by party recommendation.

Test the claim.

$H_0: P \leq .35$ claim

$H_1: P > .35$ RTT

NO α → use .05

$n = 240$

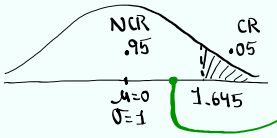
$\hat{P} = .38$

$x = n\hat{p}$

$= 240(.38) = 91.2$

$= 92$

CV Z RTT $\alpha = .05$



$Z = \text{invNorm}(.95, 0, 1) = 1.645$

CTS $Z = 1.083$

P-value $P = .139$

1-PropZTest

$P_0: .35$ H_0

$x: 92$

$n = 240$

Prop > P_0 H_1

CTS is in NCR.

P-value > α

H_0 valid → Valid claim → FTR the claim

H_1 invalid

Nov 26-8:58 AM

CNN claims the mean age of all voters in the last election was below 45 yrs. $\mu < 45$

I took a survey of 28 voters, their mean age was 44 with standard dev. of 10.

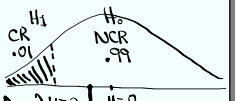
$n = 28$, $\bar{x} = 44$, $s = 10$, σ unknown

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

$H_0: \mu \geq 45$

$H_1: \mu < 45$ claim, LTT

CV t LTT $\alpha = .01$ $df = n - 1 = 27$



$t = \text{invT}(.01, 27)$

CTS $t = -.529$

P-value $P = .301$ ✓

CTS is in NCR

P-value $>$ α

H_0 Valid H_1 Invalid

Invalid claim

Reject the claim

T-Test

inpt: Stats

$\mu_0 : 45$ H_0

$\bar{x} = 44$

$S = 10$

$n = 28$

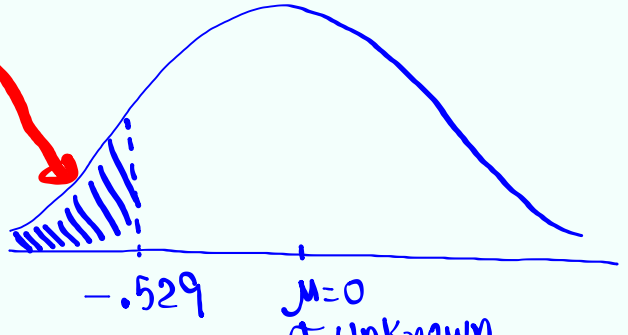
$\mu < \mu_0$ H_1

Calculate

Nov 26-9:09 AM

CTS $t = -.529$ LTT $df = 27$

find P-Value.



$\text{tcdf}(-E99, -.529, 27)$

$= .301$

Nov 26-9:21 AM

Testing one Population Standard deviation:

$H_0: \sigma = \sigma_0$	$H_0: \sigma \leq \sigma_0$	$H_0: \sigma \geq \sigma_0$
$H_1: \sigma \neq \sigma_0$	$H_1: \sigma > \sigma_0$	$H_1: \sigma < \sigma_0$
TTT	RTT	LTT

we use P-value method only.

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

For P-value → χ^2_{cdf}

1) RTT $\chi^2_{cdf}(CTS, E99, df)$

2) LTT $\chi^2_{cdf}(0, CTS, df)$

3) TTT Do (1) & (2), Multiply Smaller area by 2.

Proceed with testing chart

Draw final Conclusion for the claim.

Nov 26-9:25 AM

Given: $H_0: \sigma \leq 5$, $n=8$, $S=6$, claim is H_0, $\alpha = .1$

$df = n-1 = 7$

Test the claim.

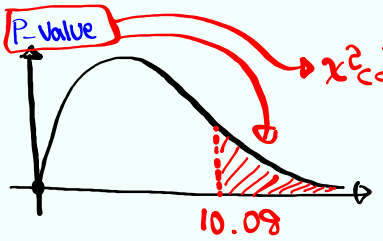
CTS $\chi^2 = \dfrac{(n-1)\cdot s^2}{\sigma^2}$

$\chi^2 = \dfrac{(8-1)\cdot 6^2}{5^2}$

$\chi^2 = 10.08$

$H_0: \sigma \leq 5$ claim

$H_1: \sigma > 5$ RTT



$\chi^2_{cdf}(10.08, E99, 7) = .184$

P-value $>$ α

.184 $>$ .1

H_0 Valid → Valid claim

H_1 Invalid

FTR the claim

Nov 26-9:32 AM

Given $H_0: \sigma \geq 10$, claim is H_1

$n = 12$, $S = 8$, $df = 11$, $\alpha = .02$

Test the claim.

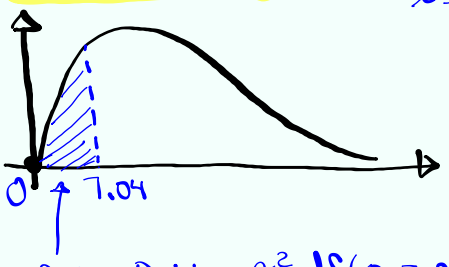
$H_0: \sigma \geq 10$

$H_1: \sigma < 10$ claim, LTT

CTS

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

$\chi^2 = 7.04$



Area = P-Value = $\chi^2 cdf(0, 7.04, 11) = .204$

P-Value $> \alpha$

.204 $>$ .02

H_0 valid, H_1 invalid → Invalid claim

Reject the Claim.

Nov 26-9:39 AM

Given $H_1: \sigma \neq 15$, claim is H_0

$n = 10$, $S = 12$, $\alpha = .1$

Test the claim.

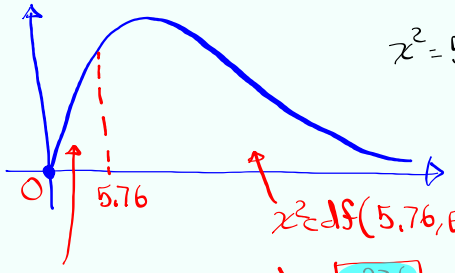
$H_0: \sigma = 15$ claim

$H_1: \sigma \neq 15$ TTT

CTS

$\chi^2 = \frac{(n-1)\cdot S^2}{\sigma^2} = \frac{(10-1)\cdot 12^2}{15^2}$

$\chi^2 = 5.76$



$\chi^2 cdf(5.76, E99, 9) = .764$

$\chi^2 cdf(0, 5.76, 9) = .236$

P-Value $= 2(.236) = .472$

P-Value $> \alpha$

.472 $>$ .1

H_0 valid → valid claim

H_1 invalid FTR the claim

Nov 26-9:48 AM