Statistics

Lecture 25

Feb 19-8:47 AM

Testing one Population Proportion: SG 24

$H_0: P = P_0$ $H_0: P \leq P_0$ $H_0: P \geq P_0$

$H_1: P \neq P_0$ $H_1: P > P_0$ $H_1: P < P_0$

TTT RTT LTT

use 1-PropZTest to find P-value.

P-value $> \alpha \Leftrightarrow H_0$ valid & H_1 invalid

P-value $\leq \alpha \Leftrightarrow H_0$ invalid & H_1 valid

Final Conclusion must be about the claim

Reject the claim (claim is invalid) **OR FTR the claim** (claim is valid)

Jun 1-9:56 AM

Given : $H_0: P = .4$ claim is H_0 $\alpha = .1$

$x = 63$, $n = 150$

Test the claim.

$H_0: P = .4$ claim

$H_1: P \neq .4$ TTT

P-Value $>$ α

.617 .1

H_0 valid, H_1 invalid

valid claim

FTR the claim

P-Value $P = .617$

STAT TESTS 1-Prop ZTest

$P_0: .4$ H_0

$x: 63$

$n: 150$

Prop $\neq P_0$ H_1

Calculate

Jun 1-10:03 AM

School claims that at most 45% of all students will be going to college. $P \leq .45$ (H_0)

I surveyed 250 students ($n = 250$) and 130 of them ($x = 130$) were planning to go to college.

Test the claim at $\alpha = .02$.

$H_0: P \leq .45$ claim

$H_1: P > .45$ RTT

P-Value $P = .013$

P-Value $\leq \alpha$

.013 .02

H_0 invalid & H_1 valid

Invalid claim

Reject the claim

P-Value $P =$

1-Prop ZTest

$P_0: .45$ H_0

$x = 130$

$n = 250$

Prop $> P_0$ H_1

Calculate

Jun 1-10:13 AM

School claims that less than 80% of all students have iPhone. $P < .8$ ← H_1

I surveyed 300 students and 76% of them had iPhone. $n = 300$ $\hat{P} = .76$

$n = n\hat{P} = 300(.76) = 228$

No α → .05

Test the claim if decimal, round-up

$H_0: P \geq .8$

$H_1: P < .8$ claim, LTT

P-Value P= .042

P-Value P= 1-PropZTest

$P_0: .8$ H_0

$x: 228$

$n = 300$

Prop $< P_0$ H_1

Calculate

P-Value $\leq \alpha$

.042 .05

H_0 invalid, H_1 valid

valid claim

FTR the claim

Jun 1-10:24 AM

Testing one Population Mean:

$H_0: \mu = \mu_0$ $H_0: \mu \leq \mu_0$ $H_0: \mu \geq \mu_0$

$H_1: \mu \neq \mu_0$ $H_1: \mu > \mu_0$ $H_1: \mu < \mu_0$

TTT RTT LTT

Case I: σ Known	Case II: σ unknown
Z-Test	T-Test
inpt:	STATS

Proceed like testing Pop. Proportion.

Jun 1-10:36 AM

Given: $H_0: \mu = 85$ claim is H_0 $\alpha = .01$

$\sigma = 12$ $\bar{x} = 88$ $n = 32$

Test the claim. → σ Known

$H_0: \mu = 85$ claim

$H_1: \mu \neq 85$ TTT

P-Value $P = .157$

P-Value $>$ α

.157 .01

H_0 valid H_1 invalid

Valid claim

FTR the claim

Case I

Z-Test

input:	Stats
$\mu_0: 85$	H_0
$\sigma = 12$	
$\bar{x} = 88$	
$n = 32$	
$\mu \neq \mu_0$	H_1

Calculate

Jun 1-10:42 AM

Given $H_0: \mu \leq 32$ claim is H_1 $\alpha = .1$

$\bar{x} = 40$ $S = 8$ $n = 20$

Test the claim.

$H_0: \mu \leq 32$

$H_1: \mu > 32$ claim, RTT

P-Value $P = 1.3 \times 10^{-4}$

P-Value $\leq \alpha$

1.3×10^{-4} .1

H_0 invalid & H_1 valid

Valid claim

FTR the claim

σ unknown

Case II

T-Test

input:	Stats
$\mu_0: 32$	H_0
$\bar{x} = 40$	
$S = 8$	
$n = 20$	
$\mu > \mu_0$	H_1

Calculate

Jun 1-10:51 AM

LAUSD claims the mean of all SAT Scores is more than 1200. $\mu > 1200$ ← H_1

A Sample of 40 SAT exams had a mean of 1225. $n = 40$ $\bar{x} = 1225$

It is known that Standard deviation of all SAT exams is 100. $\sigma = 100$

no $\alpha \rightarrow .05$

Test the claim.

$H_0: \mu \leq 1200$

$H_1: \mu > 1200$ claim, RTT

P-Value $P = .057$

P-Value $>$ α

.057 .05

H_0 valid, H_1 invalid

Invalid claim

Reject the claim

Case I

Z-Test

$\mu_0 : 1200$

$\sigma = 100$

$\bar{x} = 1225$

$n = 40$

$\mu > \mu_0$ H_1

Jun 1-11:00 AM