Statistics

Lecture 29

Feb 19-8:47 AM

Consider chart below for ages of randomly select students

Females			Males		
24	32	45	19	26	30
18	20	30	30	35	40
35	28	40	42	25	28
	20			40	
$\bar{x} = 29$			$\bar{x} = 32$		
$s = 9$			$s = 8$		
$n = 10$			$n = 10$		

1) Find $\bar{x}$, s, and n for each group. Round to whole #.

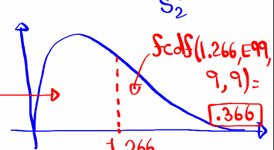
2) Set-up the chart below such that $S_1 > S_2$

Sample 1	Sample 2
$S_1 = 9$	$S_2 = 8$
$n_1 = 10$	$n_2 = 10$

3) $Ndf = n_1 - 1 = 9$, $Ddf = n_2 - 1 = 9$, CTS $F = \dfrac{S_1^2}{S_2^2} = 1.266$

4) Find P-value for TTT.

$Fcdf(0, 1.266, 9, 9) = \boxed{.634}$



P-value = 2 · Smaller area = 2(.366) = $\boxed{.732}$

Dec 12-7:22 AM

5) Now let's use 2-SampFTest to verify the earlier answers for TTT.

STAT TESTS $\boxed{\text{2-SampFTest}}$

inpt: $\boxed{\text{Stats}}$

$s_1 = 9$

$n_1 = 10$

$s_2 = 8$

$n_2 = 10$

$\sigma_1 \neq \sigma_2$ TTT

CTS $F = 1.266$

P-Value $p = .731$

No $\alpha \to$ use .05

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

P-value > α

.732 .05

H_0 valid $\to$ Valid claim

H_1 invalid

FTR the claim

SG 31✓

Dec 12-7:33 AM

Comparing at least 3 population means SG 35

$H_0: \mu_1 = \mu_2 = \mu_3 = \cdots = \mu_K$

H_1: At least one mean is different. RTT

K $\to$ # of groups

n $\to$ Total Sample Size $\Rightarrow$ $\boxed{\begin{array}{l} Ndf = K-1 \\ Ddf = n-K \end{array}}$

Method $\to$ ANOVA (Analysis of Variance)

Store each group in a list.

CTS F

P-value P $\to$ STAT TESTS ↑ ANOVA(L1,L2,L3,

Use $\boxed{\text{testing chart}}$ to proceed.

Draw final conclusion for the claim.

Dec 12-7:41 AM

I randomly selected exams from 3 different colleges.

Here are the scores:

ELAC			Mt. SAC			Chaffey		
75	82	100	70	65	100	86	92	75
70	68	85	84	80	96	100	80	90
90	98	88	98	90				

$K=3$

$n = 9 + 8 + 6 = 23$

No α → use .05

⇒ $Ndf = K-1 = 2$

$Ddf = n-K = 20$

Test the claim that all pop. means are equal.

$H_0: \mu_1 = \mu_2 = \mu_3$ claim

H_1: At least one mean is different. RTT

ELAC → L1

Mt.SAC → L2

Chaffey → L3

$\boxed{STAT}$ TESTS $\boxed{ANOVA(}$ L1, L2, L3

$\boxed{Enter}$

CTS F = .138

P-value P = .872

P_value > α

.872   .05

H_0 valid → valid claim → FTR the claim

H_1 invalid

Dec 12-7:47 AM

I randomly selected students from different schools.

Here are their ages:

Chaffey			ELAC			Mt. SAC			UCLA		
24	26	30	19	23	29	27	33	20	30	35	40
18	25		32	30		17	24		45	50	

$K=4$

$n = 5+5+5+5 = 20$

⇒ $Ndf = K-1 = 3$

$Ddf = n-K = 16$

Use $\alpha = .1$ to test the claim that all means are the same.

$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$ claim

H_1: At least one mean is different. RTT

Chaffey → L1

ELAC → L2

Mt.SAC → L3

UCLA → L4

⇒ ANOVA(L1, L2, L3, L4)

CTS F = 7.549

P-value P = .002

P-value ≤ α

.002   .1

H_0 invalid → Invalid claim

H_1 valid

Reject the claim

Dec 12-7:59 AM

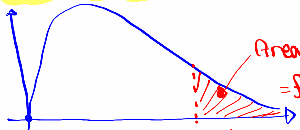
Suppose we are $\boxed{\text{comparing 5}}$ pop. means with $\boxed{\text{total Sample Size 30}}$ and CTS $F = 3.456$.

$K = 5$, $n = 30$ → $Ndf = K - 1 = 4$, $Ddf = n - K = 25$

Test the claim at $\boxed{\alpha = .1}$ that not all pop. means are the Same.

$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$

H_1: At least one mean is different. RTT, claim



Area = P_value = fcdf(3.456, E99, 4, 25) = $\boxed{.022}$

P_value $\leq \alpha$ — .022, .1

H_0 invalid

H_1 valid → valid claim → FTR the claim

If we choose α to be .01, then

P_value $> \alpha$ → H_0 valid
.022, .01

H_1 invalid → Invalid claim → Reject the claim

SG 35 ✓

Dec 12-8:10 AM