Statistics
Spring 2023
Lecture 54

Feb 19-8:47 AM

SG 31

10 randomly selected female nurses had a mean age of 42 and standard deviation of 8.

12 randomly selected male nurses had a mean age of 45 and standard deviation of 10.

Test the claim that two population standard deviations are different.

No $\alpha \rightarrow$ use .05

$\sigma_1 \neq \sigma_2$ claim

$H_0: \sigma_1 = \sigma_2$

No = Sign $\Rightarrow H_1$

$H_1: \sigma_1 \neq \sigma_2$ claim, TTT

Group/Sample with larger standard deviation becomes Sample 1.

	Males	Females
	$n_1 = 12$	$n_2 = 10$
	$\bar{x}_1 = 45$	$\bar{x}_2 = 42$
	$s_1 = 10$	$s_2 = 8$
	$s_1 > s_2$	

Num = $n_1 - 1 = 11$

Den = $n_2 - 1 = 9$

C.T.S. F = 1.563

P-value P = .512 ✓

2-Samp F Test

Using P-value method

P-value $> \alpha$

.512 $> .05$ $\Rightarrow H_0$ valid, H_1 invalid

Invalid claim

Reject the claim

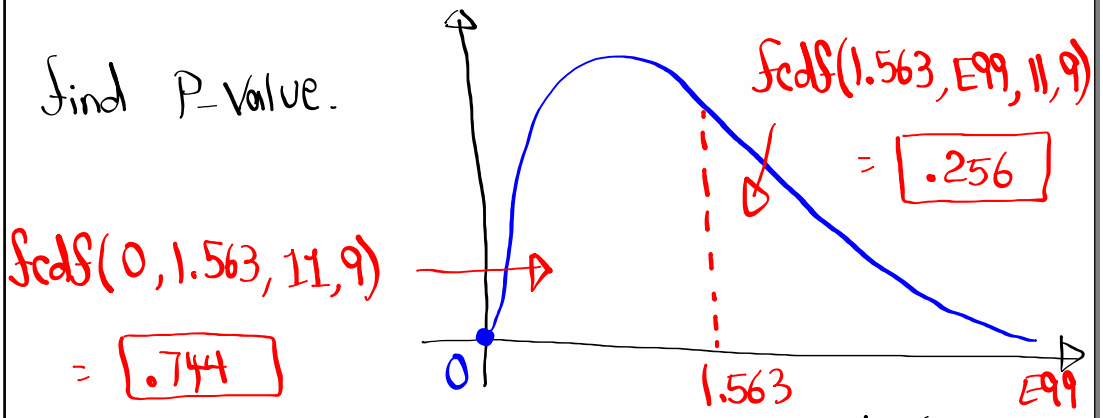
CTS Formula

$$F = \frac{s_1^2}{s_2^2} = \frac{10^2}{8^2} = 1.5625 \approx 1.563$$

May 22-7:17 AM

Given CTS $F=1.563$, TTT, $Ndf=11$, $Ddf=9$

Find P-Value.



Total Area = .744 + .256 = 1 ✓

P-value = 2 * Smaller area = 2(.256) = .512

May 22-7:29 AM

Use the chart below to test the claim that $\sigma_1 > \sigma_2$ with $\alpha = .1$.

Sample 1	Sample 2
$S_1 = 12$	$S_2 = 8$
$n_1 = 15$	$n_2 = 10$
Ndf = 14	Ddf = 9

1) verify $S_1 > S_2$ ✓

2) $H_0: \sigma_1 \leq \sigma_2$

$H_1: \sigma_1 > \sigma_2$ claim, RTT

3) CTS by formula

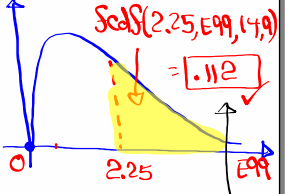
$$F = \frac{S_1^2}{S_2^2} = \frac{12^2}{8^2} = 2.25$$

P-value $> \alpha \Rightarrow H_0$ valid

H_1 invalid

Invalid claim $\Rightarrow$ Reject the claim

4) P-value by fcdf



for the RTT P-value = .112

5) CTS $F = 2.25$
P-value $P = .112$ ✓
2-Samp F Test

SG 31

May 22-7:36 AM

Clear all lists.

Re Set all lists.

L1	L2	L3
75	78	79
82	88	85
90	98	98
100	85	
95		

STAT

TESTS ↑ 2nd 3

ANOVA ↓

ANOVA(L1, L2, L3

2nd 1 → L1, L2

Enter

7 → L3

2nd 2 → L2

CTS F = .021

P-value P = .980

May 22-7:48 AM

Clear all lists.

L1	L2	L3	L4
25	19	20	38
18	24	23	45
32	33	27	55
20	25	38	50
45	40		
30			

K → # of groups

K = 4

n → Total Sample Size

n = 6 + 5 + 4 + 4 = 19

NdF = K − 1 = 4 − 1 = 3 ✓

DdF = n − K = 19 − 4 = 15 ✓

STAT TESTS

ANOVA(

L1, L2, L3, L4 Enter

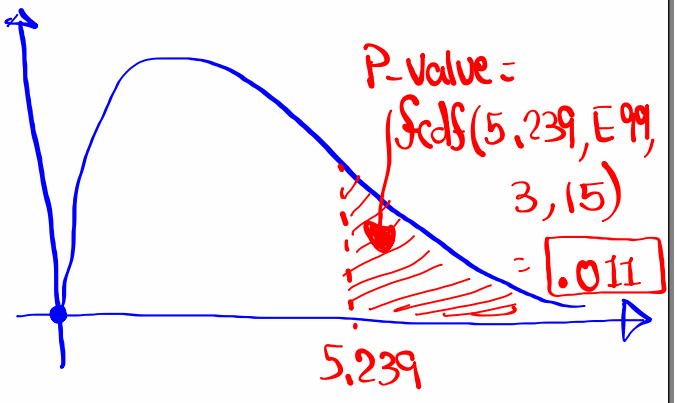
CTS F = 5.239

P-value P = .011

May 22-7:53 AM

CTS F = 5.239 Ndf = 3 Ddf = 15 RTT

Find P-value.



May 22-8:02 AM

Clear all lists

L1	L2	L3	L4	L5
8	7	8	7	8
9	8	8	8	8
6	9	9	8	8
10	6	9	10	10
5	10	7	6	5

K = # of lists/groups

K = 5

n = Total Sample Size

n = 5 + 5 + 5 + 5 + 5

n = 25

ANOVA(L1, L2, L3, L4, L5

Enter

Ndf = K - 1 = 4

Ddf = n - K = 20

CTS F = .101

P-value P = .981

Comparing at least 3 pop. means.

SE 35

May 22-8:05 AM