Math 227
Spring 2021
Lecture 14

Standard deviation of ages of 8 randomly Selected females students was 7.5 and for 10 randomly selected males students was 5. Use $\alpha=.02$ to test the claim that two population standard deviations are different. $\sigma_1 \neq \sigma_2$

$H_0: \sigma_1 = \sigma_2$

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

Females	Males
$n_1=8$	$n_2=10$
$S_1=7.5$	$S_2=5$

$Ndf = n_1-1=7$ $S_1 > S_2$

$Ddf = n_2-1=9$

CTS $F = 2.25$

P-value $P = .256$

P-value Method

2-SampF Test

P-Value $> \alpha$

$.256 \quad .02$

H_0 Valid

H_1 invalid

Reject the claim

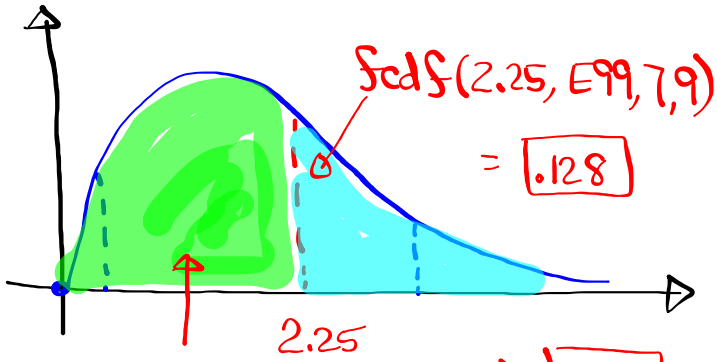
invalid claim

CTS F=2.25

TTT

Ndf=7

Ddf=9



Find P-Value

= 2*Smaller area

= 2 (.128) = .256

SG 36

Comparing at least 3 population Means:

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

H_1: At least one pop. mean is different. RTT

K → # of groups

n → Total Sample Size

CTS F

P-Value P

Stat Tests ANOVA(L1, L2, L3, ...

↑ Analysis of Variance

To verify P-Value

fcdf

RTT

Ndf = K-1

Ddf = n-K

Randomly Selected exams from 3 different classes:

Morning	Afternoon	Evening
72 85	75 65	70 80
93 100	95 85	90 100
68 80	100	85 65

$K=3$

$n=6+5+6=17$

$Ndf=k-1=2$

$Ddf=n-k=14$

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

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

H_1: At least one mean is different. RTT

Morning $\rightarrow$ L1

Afternoon $\rightarrow$ L2

Evening $\rightarrow$ L3

CTS $F=.044$

P-Value $P=.957$

ANOVA(L1, L2, L3)

P-value $> \alpha \rightarrow H_0$ valid, H_1 invalid

Valid claim $\Rightarrow$ FTR the claim

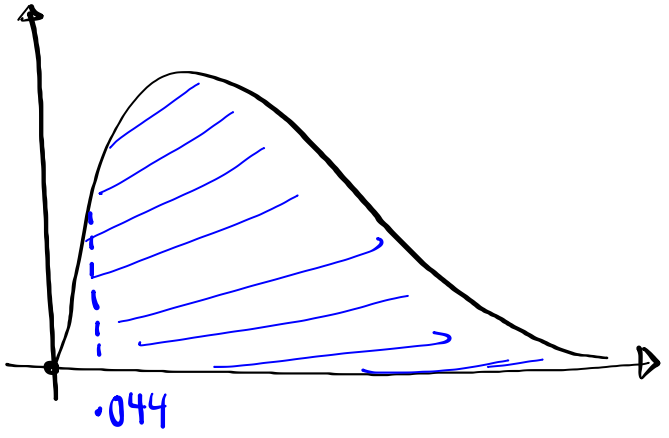
CTS $F=.044$

RTT

$Ndf=2$

$Ddf=14$

Find P-Value



fcdf(.044, E99, 2, 14) = .957

Students were randomly selected from four different schools. Chart below shows their ages.

ELAC		Mt. SAC		Chaffey		UCLA		
21	19	18	23	24	17	28	35	40
32	25	27	34	34	40	19	45	50
35	40	42		32			58	

No $\alpha \rightarrow .05$

Test the claim that not all Pop. means are the same.

$K=4$

$n=6+5+5+7=23$

$NDF=K-1=3$

$DdF=n-K=19$

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

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

ELAC $\rightarrow$ L1

Mt.SAC $\rightarrow$ L2

Chaffey $\rightarrow$ L3

UCLA $\rightarrow$ L4

CTS $F=1.594$

P-Value $P=.224$

ANOVA (L1, L2, L3, L4)

P-Value $> \alpha$ H_0 valid & H_1 invalid

Reject the claim — invalid claim