Statistics

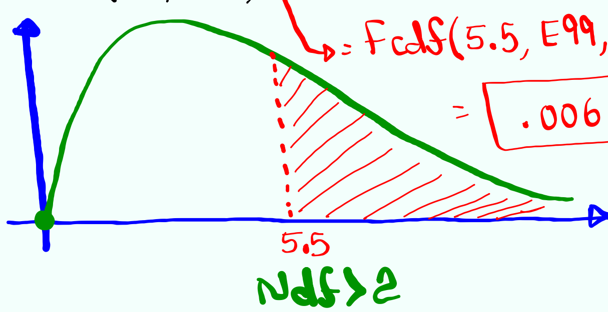
Lecture 15

Feb 19-8:47 AM

Find $P(F > 5.5)$ with $Ndf = 3$ & $Ddf = 20$.

$= Fcdf(5.5, E99, 3, 20)$

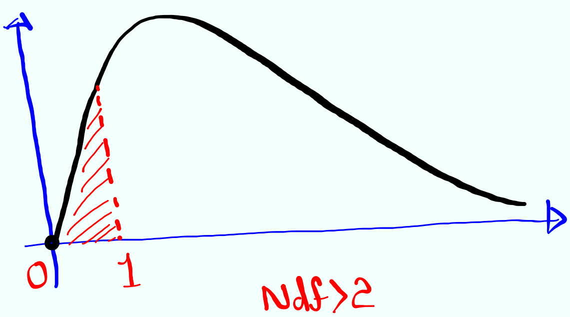
$= \boxed{.006}$



Find $P(F < 1)$ with $Ndf = 4$ & $Ddf = 25$.

$= Fcdf(0, 1, 4, 25)$

$= \boxed{.574}$ ✓



Dec 9-6:50 PM

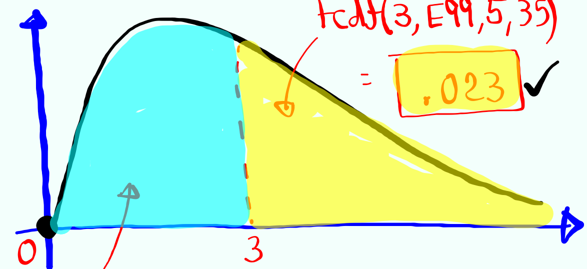
Given $F = 3$, $Ndf = 5$ & $Ddf = 35$

1) Find the area to its right.

2) Find the area to its left.

3) Find twice the Smaller area.

$Fcdf(3, E99, 5, 35) = \boxed{.023}$ ✓



$Fcdf(0, 3, 5, 35) = \boxed{.977}$ ✓ $Ndf > 2$

$2 \cdot \text{Smaller area} = 2(.023) = \boxed{.046}$

Dec 9-6:56 PM

Use the chart below to test the claim that $\boxed{\sigma_1 > \sigma_2}$. H_1

No $\alpha \to .05$

Sample 1	Sample 2
$n_1 = 10$	$n_2 = 12$
$S_1 = 7$	$S_2 = 5$

$H_0: \sigma_1 \leq \sigma_2$

$H_1: \boxed{\sigma_1 > \sigma_2}$ claim, RTT

1) $S_1 > S_2$ ✓

2) $Ndf = n_1 - 1 = 9$, $Ddf = n_2 - 1 = 11$

3) CTS $F = \dfrac{S_1^2}{S_2^2} = \dfrac{7^2}{5^2} = 1.96$ ✓

Use 2-SampF Test

CTS $F = 1.96$

P-value $P = .145$ ✓

P-value $> \alpha$

H_0 valid, H_1 invalid

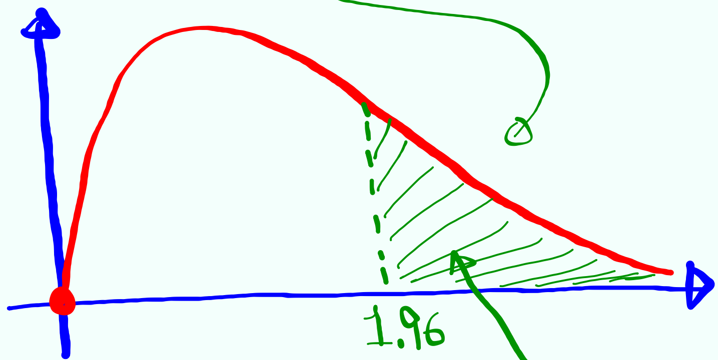
Invalid claim

Reject the claim

Dec 9-7:01 PM

Given CTS $F = 1.96$ RTT Ndf $= 9$ Ddf $= 11$

Find P-Value.



Ndf > 2

P-Value = Area

$\text{Fcdf}(1.96, E99, 9, 11) = \boxed{.145}$

Dec 9-7:11 PM

8 exams were randomly selected from the morning class, standard deviation of scores was 9.

$n = 8$ $S = 9$

10 exams were randomly selected from the online class, standard deviation of scores was 6.

$n = 10$ $S = 6$

Use $\boxed{\alpha = .02}$ to test the claim that two population standard deviations are different.

$\sigma_1 \neq \sigma_2$ ← H_1

$H_0: \sigma_1 = \sigma_2$

$H_1: \boxed{\sigma_1 \neq \sigma_2}$ claim, TTT

Morning	Online
$n_1 = 8$	$n_2 = 10$
$s_1 = 9$	$s_2 = 6$

1) $S_1 > S_2$ ✓

2) Ndf $= n_1 - 1 = 7$, Ddf $= n_2 - 1 = 9$

3) CTS $F = \frac{S_1^2}{S_2^2} = 2.25$ ✓

Use 2-SampFTest

CTS $F = 2.25$ ✓

P-Value $P = .256$

P-Value $> \alpha$

$.256$ $.02$

H_0 Valid

H_1 invalid

Invalid claim

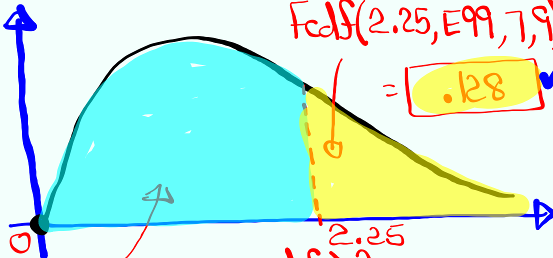
Reject the claim

Dec 9-7:15 PM

Given CTS $F = 2.25$ TTT

$Ndf = 7$ $Ddf = 9$

Find P-Value.



$Fcdf(2.25, E99, 7, 9) = \boxed{.128}$ ✓

$Ndf > 2$

$Fcdf(0, 2.25, 7, 9) = \boxed{.872}$ ✓

P-Value $= 2 \cdot$ Smaller Area $= 2 \cdot (.128) = \boxed{.256}$

SG 29 Double Points

Dec 9-7:26 PM

Comparing at least 3 population Means:

SG 33

Method: ANOVA

(Analysis of Variance)

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

H_1: At least one mean is different. RTT

$K \to$ # of groups

$n \to$ Total Sample Size

$\Rightarrow$ $Ndf = K - 1$

$Ddf = n - K$

CTS $F =$

P-Value $P =$

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

First we store data elements from each group into L1, L2, L3, ...

Proceed with testing chart & P-Value Method.

Dec 9-7:36 PM

I randomly Selected students from 3 different Colleges. Here are their ages:

ELAC			Mt. SAC			Chaffey		
23	27	20	19	28	33	20	30	32
18	30	32	25	24		28	25	24

no $\alpha \to .05$

Test the claim that all pop. means are the Same.

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

$K=3$ $Ndf = K-1 = 2$

H_1: At least one mean is different. RTT

$n=17$ $Ddf = n-K = 14$

ELAC → L1

Mt. SAC → L2

Chaffey → L3

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

$\boxed{\begin{array}{l} \text{CTS } F = .132 \\ \text{P-Value } p = .877 \end{array}}$

P-Value $> \alpha$

$.877$ $\quad .05$

H_0 valid $\quad H_1$ invalid

Valid claim

FTR the claim

Dec 9-7:43 PM

I randomly Selected exams from 4 classes. Here are the Scores.

L1 In-Person			L2 Monday only			L3 Tuesday only			L4 online		
73	85	90	78	92	68	86	96	75	94	98	100
65	70	80	88	60	80	70	80	90	88	95	100
							65			90	

Use $\boxed{\alpha = .1}$ to test the claim that not all pop. means are the Same.

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

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

$K=4$ $\quad Ndf = K-1 = 3$

$n=26$ $\Rightarrow$ $Ddf = n-K = 22$

ANOVA(L1, L2, L3, L4)

$\boxed{\begin{array}{l} \text{CTS } F = 5.132 \\ \text{P-Value } P = .008 \end{array}}$

P-Value $\leq \alpha$

$.008$ $\quad .1$

H_0 invalid $\quad H_1$ Valid

Valid claim

FTR the claim

Dec 9-7:55 PM

Given CTS $F = 4.188$ $Ndf = K-1 = 2$

$K=3$ $n=22$ $Ddf = n-K = 19$

Suggest a α value that $\boxed{\text{FTR } H_0}$ choose α

P-Value $> \alpha$ $.031 > \alpha$ to be .03, .02, .01

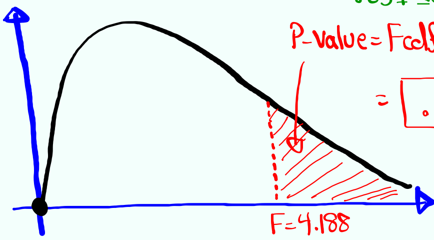
Suggest a α value that $\boxed{\text{reject } H_0}$ choose α

we need P-Value P-value $\le \alpha$ to be

$.031 \le \alpha$ .04, .05, .06, .07, ...

P-Value = Fcdf(4.188, E99, 2, 19)

$= \boxed{.031}$



SG 33 Double Points