Statistics Final Exam Review

Feb 19-8:47 AM

SG 35

Consider exam scores for 3 different classes:

Morning (L1)	Afternoon (L2)	online (L3)
72 85 90	76 88 90	88 100 95
92 88 70	93 85 68	90 100 90
65		85

$K=3$, $n=7+6+7=20$ ANOVA(L1, L2, L3

$NDf=K-1=2$ $Df=n-K=17$

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

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

H_1: At least one mean is different. RTT

We must use ANOVA because we are comparing at least 3 pop. means.

ANOVA(L1, L2, L3

CTS $F=3.501$

P-value $=.053$

P-value $\leq \alpha$ ($.053 \leq .1$) → H_0 invalid, H_1 valid → Invalid claim → Reject the claim

If we choose α to be .05, .04, .03, .02, or .01, then P-value $> \alpha$ → H_0 valid, H_1 invalid → Valid claim → FTR the claim

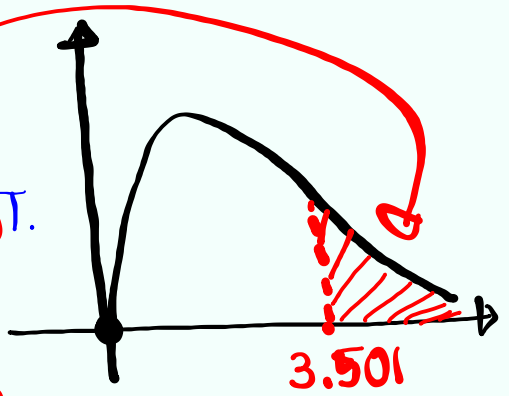
Dec 9-8:51 AM

CTS $F = 3.501$

$K = 3$, $n = 20$

ANOVA is always RTT.

Find P-Value



$Ndf = K - 1 = 2$, $Ddf = n - K = 17$

$\rightarrow fcdf(3.501, E99, 2, 17) = .053$

Dec 9-9:04 AM

SG 31

Use the chart below

Sample 1	Sample 2
$n_1 = 7$	$n_2 = 10$
$S_1 = 8$	$S_2 = 5$

1) Verify $S_1 > S_2$ ✓

2) $Ndf = n_1 - 1 = 6$

$Ddf = n_2 - 1 = 9$

3) CTS $F = \frac{S_1^2}{S_2^2} = \frac{8^2}{5^2} = 2.56$

No $\alpha \rightarrow .05$

4) Test the claim that there is a difference between two Population standard deviations

$H_0 : \sigma_1 = \sigma_2$

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

CTS $F = 2.56$

P-Value $P = .198$ ✓

2-Samp F Test

P-Value $>$ α

.198 .05

H_0 valid

H_1 invalid → Invalid claim → Reject the claim

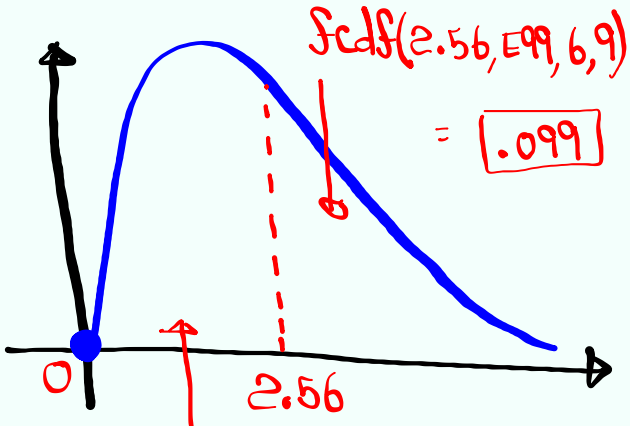
Dec 9-9:07 AM

CTS $F = 2.56$

$Ndf = 6$, $Ddf = 9$

TTT

Find P-Value



fcdf(0, 2.56, 6, 9) = .901

P-Value = 2 · Smaller area

$= 2(.099) = .198$

Dec 9-9:15 AM

SG 27

Given $n = 10$, $S = 15$, $\alpha = .02$

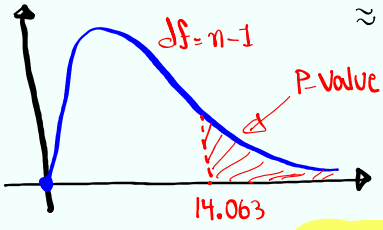
Test the claim that pop. standard deviation is at most 12. $\sigma \leq 12$

H_0: $\sigma \leq 12$ claim

H_1: $\sigma > 12$ RTT

CTS $\chi^2 = \frac{(n-1)\cdot S^2}{\sigma^2} = \frac{(10-1)\cdot 15^2}{12^2}$

≈ 14.063



P-Value > α

.120 > .02

H_0 valid

H_1 invalid

Valid claim

FTR the claim

Dec 9-9:20 AM

500 TKTS sold for $1 each.

1 ticket is randomly taken.

winner gets $100.

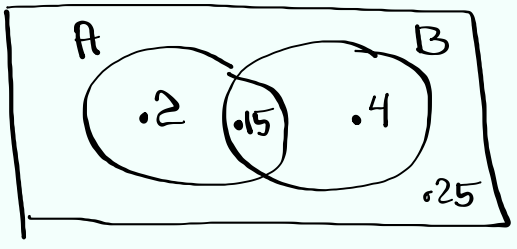
Find expected value per ticket sold.

L1 Net	L2 P(Net)	
1 − 100	1/500	winning TKT
1 − 0	499/500	Losing TKTS

E.V. = $\mu = \bar{x} = .8$

$= 80¢$

Dec 9-9:29 AM



P(A only) = .2

P(A) = .35

P(B only) = .4

P(B) = .55

P(A and B) = .15

P(A or B) = P(A) + P(B) − P(A and B)

= .35 + .55 − .15 = .75

$P(\bar{A} \text{ and } \bar{B}) = P(\overline{A \text{ or } B}) = 1 - .75 = \boxed{.25}$

$P(\bar{A} \text{ or } \bar{B}) = P(\overline{A \text{ and } B}) = 1 - .15 = \boxed{.85}$

Dec 9-9:34 AM

Suppose $n=20$, $\bar{x}=88$, $S=10$

Find 98% Conf. interval for pop. mean.

σ Known → Z Interval

σ unknown → T Interval

STAT TESTS TInterval

Inpt: Stats

$\bar{x}=88$ ← whole #

$S=10$

$n=20$

C-level: .98

$82 < \mu < 94$

Dec 9-9:40 AM

$n=1600$

Fair Coin

$P=.5$

$q=.5$

$\mu = np = 1600(.5) = 800$

$\sigma^2 = npq = 1600(.5)(.5) = 400$

$\sigma = \sqrt{\sigma^2} = \sqrt{400} = 20$

68% Range $\mu \pm \sigma$

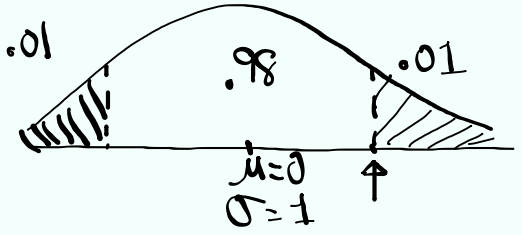
$= 800 \pm 20$

780 to 820

Dec 9-9:44 AM

min. Sample Size for mean

$$n = \left(\frac{z_{\alpha/2} \cdot \sigma}{E}\right)^2 = \left(\frac{2.326 \cdot 10.5}{5}\right)^2 \approx 24$$



$z_{\alpha/2} = \text{invNorm}(.99, 0, 1) = 2.326$

Dec 9-9:47 AM

class MP	class F
12	4
20	6
28	10
36	5

Class MP → L1

Class F → L2

1-Var Stats

List: L1

Freq List: L2

$\bar{x} = 25.12$

$S_x = 7.960$

$n = 25$

$\rightarrow S^2 = \frac{1584}{25}$

Dec 9-9:53 AM