Statistics

Lecture 29

Feb 19-8:47 AM

8 people were randomly selected and participated in a diet plan.

Before	After	L3
175	165	10
200	185	15
150	150	0
185	195	-10
190	180	10
225	200	25
240	240	0
165	155	10

Before → L1

After → L2

L1 − L2 → L3

use L3 only to find

$\bar{d} = 7.5$

$S_d = 10.690$

$S_d^2 = \frac{800}{7}$

Find Conf. interval for the mean of all differences

No C-level → .95

μ_d

T-Interval

$-1 < \mu_d < 16$

$E = \frac{16 - (-1)}{2} = 8.5$

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Test the claim that diet works.

No $\alpha \rightarrow .05$

$\mu_d > 0$ ← H_1

$H_0: \mu_d \leq 0$

$H_1: \mu_d > 0$ - RTT, claim

use T-Test

CTS $t = 1.984$

P-value $P = .044$

P-Value $\leq \alpha$

$.044 \quad .05$

H_0 invalid, H_1 valid

Valid claim → FTR the claim

If we choose α to be

.04, .03, .02, or .01

P-value $> \alpha$

H_0 valid

H_1 invalid → Invalid claim Reject the H_0

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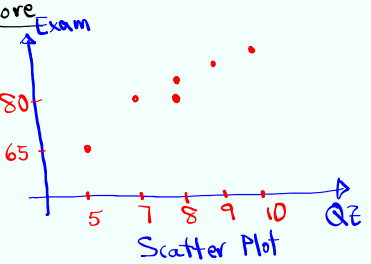
Qz Score	Exam Score
7	80
8	85
5	65
9	90
10	95
8	80



Scatter Plot

Qz Score → X → L1, Exam Score → y → L2

$a = 36.292 \approx 36$

$b = 5.899 \approx 6$

$r^2 = .960 \approx 96\%$

$r \approx .980$

$\rightarrow \boxed{y \approx 36 + 6x}$

96% of exam Scores are explained by quiz Scores.

r is very close to 1.

It appears to be significant.

use regression line

Predict exam Score if Qz Score is 6

$y \approx 36 + 6(6) \approx \boxed{72}$

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Use $\alpha = .02$ to determine whether Linear Correlation is significant or not.

$H_0: \rho = 0$ Not Significant

$H_1: \rho \neq 0$ Is Significant

Use LinRegTTest → CTS $t = 9.834$

P-value $P \approx 6 \times 10^{-4}$

P-value $\leq \alpha$ H_0 invalid

6×10^{-4} $.02$ H_1 valid

Linear Correlation is Significant.

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3 hospitals were randomly selected, chart below shows monthly Salaries of randomly selected nurses.

L1 USC Hospital		L2 UCLA Hospital		L3 City of Hope	
6200	6400	6850	5950	7200	7450
6000	6500	6500	6400	6850	6950
		6200		7500	

$\bar{x} = 6800$

NO $\alpha \rightarrow .05$

Test the claim that all means are the Same

we are Comparing at least 3 means → ANOVA

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

H_1: At least one mean is different. RTT

$K = 3$ $n = 15$

NDF $= K - 1 = 2$

DF $= n - K = 12$

CTS $F = 11.332$

P-value $P = .002$

ANOVA(L1, L2, L3)

P-value $\leq \alpha$

H_0 invalid, H_1 valid

Invalid claim

Reject it

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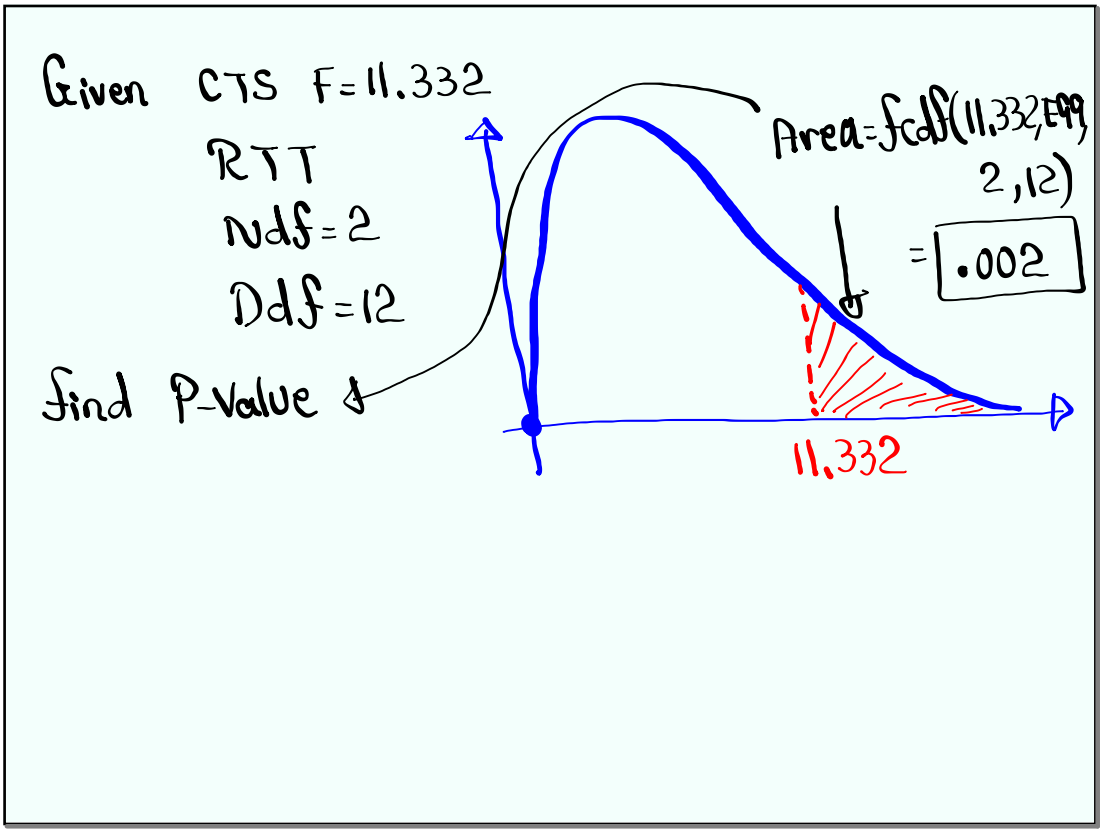

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Consider the chart below:

SG 32 Not on the exam. will not be collected

	Yes	NO
Females	40	10
Males	20	30

Are answers & Genders are dependent or independent?

Rows & Columns.

H_0: Rows & Columns are independent

H_1: Rows & Columns are dependent.

Store our information in matrix A.

2nd x^{-1} → Edit choose 1 for matrix A

make 2×2 and enter information

$A=\begin{bmatrix}40 & 10\\ 20 & 30\end{bmatrix}$

CTS x^2

P-Value P

STAT TESTS x^2-TEST

Observed A

Expected B

Calculate

CTS $x^2 = 16.667$

P-Value $P = 4.5 \times 10^{-5}$

P-Value $\leq \alpha$

4.5×10^{-5} .05

H_0 invalid

H_1 Valid

Dependent

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Is love blind?

Husband \ Wife	Short	Avg	Tall
Short	23	37	15
Avg	18	42	15
Tall	14	26	10

Matrix A
3x3

Test the claim that row & Column Categories are independent.

H_0: Row & columns are independent.

H_1: " " " Dependent

χ^2-Test

CTS $\chi^2 = .933$

P-value P = .920

P-value > α

H_0 valid & H_1 invalid

Independent Categories.

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You are the manager of a Company.

5 no shows on Monday
2 " " Tuesday
3 " " Wednesday
2 " " Thursday
8 " " Friday.

No $\alpha \rightarrow .05$

5 Days

20 no shows

20 ÷ 5 = 4 Per day.

observed → L1

Expected → L2

L1	L2
5	4
2	4
3	4
2	4
8	4

df = 5 - 1 = 4

χ^2 GOF - Test

Goodness - of - fit

CTS $\chi^2 = 6.5$

P-value P = .165

P-value > α

H_0 valid

H_1 invalid

H_0: $P_1 = P_2 = P_3 = P_4 = P_5$

H_1: At least one is different

Jun 1-8:07 PM