

Statistics
Lecture 31



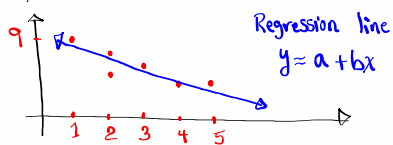
Feb 19-8:47 AM

Consider the chart below

SG 33

x	y
1	9
2	8
2	6
3	7
4	5
5	5

1) Draw Scatter Plot



2) $a = 9.369 \approx 9$
 $b = -0.953 \approx -1$
 $r^2 = .739$
 $r = -.860$

$x \rightarrow L1$, $y \rightarrow L2$, LinReg(ax+b)

Reg. line \rightarrow $y \approx 9 - x$

Coeff. of determination $r^2(\%) \approx 74\%$.

74% of y-values are explained by x-values.

Linear Correlation Coef.:

$r = -.860$ It appears to be close to -1
 So linear correlation appears to be significant.

Dec 14-7:22 AM

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

$H_0: \rho = 0$ Linear Correlation is not Significant
 $H_1: \rho \neq 0$ Linear Correlation is Significant

CTS $t = -3.367$ ✓ STAT TESTS **Lin Reg T Test**
 P-value $P = .028$ ✓
 P-value $> \alpha$
 $.028 > .02$
 H_0 valid \rightarrow Linear Correlation is not Significant
 H_1 invalid

IF we use $\alpha = .03, .04, .05, .06, .07, .08, .09, .10, \dots$
 then $P\text{-value} \leq \alpha \rightarrow H_1$ valid \rightarrow Linear Correlation is Significant

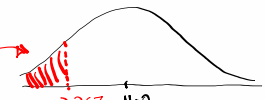
RegEQ:

Dec 14-7:30 AM

$r = -.860$
 $r^2 = .739$
 $n = 6$

CTS $t = r \cdot \sqrt{\frac{n-2}{1-r^2}}$
 $= -.860 \cdot \sqrt{\frac{6-2}{1-.739}}$
 $= -.860 \cdot \sqrt{\frac{4}{.261}}$
 $= [-3.367]$

For P-value
 t TTT $df = n-2$

$P\text{-value} = 2 \cdot \text{Area}$ 
 $P\text{-value} = 2 \cdot \text{tcdf}(-E99, -3.367, 4)$
 $= [.028]$

$\mu = 0$
 σ unknown
 $df = 6-2 = 4$

Dec 14-7:40 AM

Test the claim To determine whether Linear Correlation is significant or not.

NO $\alpha \rightarrow$ use .05

$H_0: \rho = 0$ Linear Correlation is not significant

$H_1: \rho \neq 0$ Linear Correlation is significant

we got P-value .011

P-value $\leq \alpha$ H_0 invalid

.011 \leq .05 H_1 valid \rightarrow Linear Correlation is significant

Predict exam Score if QZ Score is 8.

Since r is significant \Rightarrow Use Regression Line

SG 33 ✓

$$\begin{aligned}y &\approx 32 + 6x \\ &= 32 + 6(8) \\ &= 32 + 48 \\ &= \boxed{80}\end{aligned}$$

Dec 14-8:03 AM