

Statistics

Spring 2023

Lecture 13



Feb 19-8:47 AM

How to make Predictions:

IF r is Significant
 \Rightarrow Use the regression line
 $y = a + bx$

IF r is not Significant
 \Rightarrow Use \bar{y}

$$\bar{y} = \frac{\sum y}{n}$$

or

VARs

5: Statistics

5: \bar{y}

Enter

Feb 27-8:30 AM

Suppose the regression line is

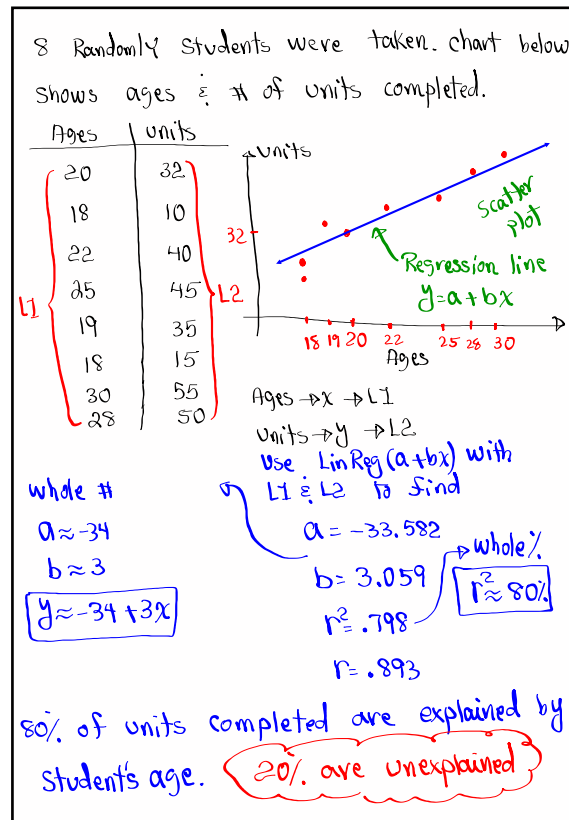
$$y = 64 + 5x, \quad \sum y = 845, \quad n = 10$$

Predict y when $x = 6$ if

1) r is significant $\rightarrow y = 64 + 5x$
 $= 64 + 5(6)$
 $= 64 + 30 \rightarrow y = 94$

2) r is not significant $\rightarrow \bar{y} = \frac{\sum y}{n} = \frac{845}{10} = 84.5$

Feb 28-7:18 AM



Feb 28-7:22 AM

Since r is close to 1, we can assume that linear correlation is significant.

Predict the number of units completed if a randomly selected student is

32 yrs

a) Assume r is significant.

Use Regression line

$$y = -34 + 3x = -34 + 3(32) = 62$$

b) assume r is not significant.

Use $\bar{y} = 35.25$

≈ 36

Not to under estimate

VARs

5: Statistics

5: \bar{y} Enter

35.25

Feb 28-7:37 AM

Use the following chart

x	y
1	8
2	5
2	4
4	2
5	2
8	1

1) Draw Scatter Plot and a possible regression line.

Regression line $y = a + bx$

$x \rightarrow L1$
 $y \rightarrow L2$

\Rightarrow Lin Reg ($a + bx$) with L1 & L2 to find

$a = 6.82 \approx 6.8$
 $b = -.86 \approx -.9$

$\Rightarrow y \approx 6.8 - .9x$

$r^2 = .740$
 $r = -.86$

$r^2 \approx 74\%$
Coef. of determination

Since r is close to -1, linear correlation is significant

26% are unexplained } 74% of Y-values are explained by X-values.

Feb 28-7:44 AM

Now Predict y when x is 6 if

1) r is Significant \rightarrow Use regression line

$$y = 6.8 - .9x = 6.8 - .9(6) = 1.4$$

2) r is not Significant. \rightarrow Use \bar{y}

$$\bar{y} = 3.\bar{6} \approx 3.7$$

SG 9 ✓

VARs
5: Statistics
5: \bar{y}
Enter

Feb 28-7:57 AM

Class QZ 2

Use the chart below

x	y
4	15
6	20
6	24
8	30
10	32
12	35

Use Lin Reg ($a+bx$) to find

$$a = 6.892 \approx 7 \quad \left. \begin{array}{l} \text{Round to} \\ \text{whole \#} \end{array} \right\}$$

$$b = 2.492 \approx 2 \quad \left. \begin{array}{l} \text{Round to} \\ \text{whole \%} \end{array} \right\}$$

$$r^2 = .916 \approx 92\% \quad \left. \begin{array}{l} \text{Round to} \\ \text{whole \%} \end{array} \right\}$$

$$r = .957 \quad \left. \begin{array}{l} \text{3-decimals} \end{array} \right\}$$

$$\bar{y} = 26$$

Feb 28-8:02 AM