

12d Wednesday, April 24  
Residual Values

### 1.4 exercise 4

Step one: Create a table of values with 4 columns, where the first two columns are the X and Y values from the dataset.

Step two: In the third column calculate y- values for each Dataset X value based on the line of best fit equation.

Step three: Calculate Residual values ( $R_i$ ) in the fourth column. Subtract the Dataset y-value ( $y_i$ ) by the line of best fit y-value ( $y_{Li}$ ).

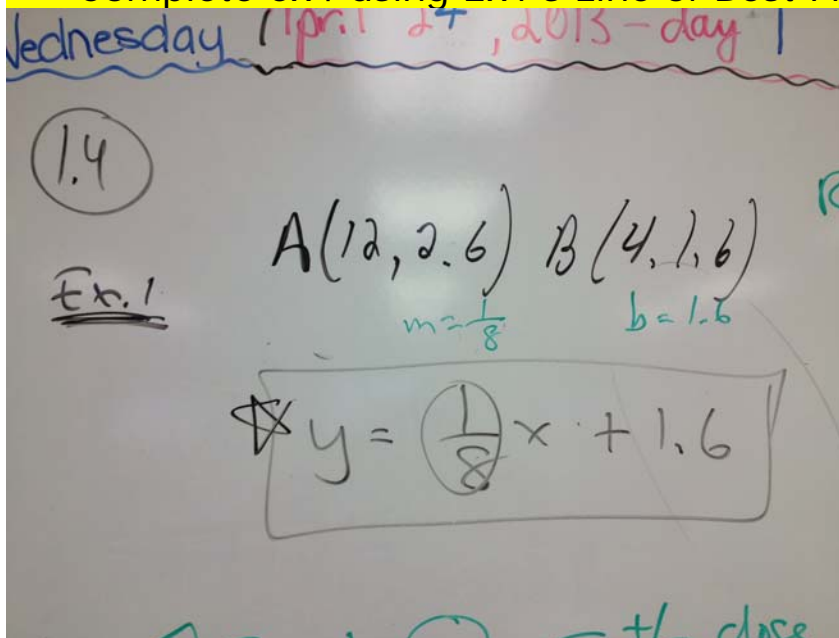
Step four: Calculate the sum of the residual values ( $\sum R_i$ ) at the bottom of column 4.

\*\*\*what do you notice???

Step five: Draw a residual plot

Step six: Conclusions from this data analysis and errors/adjustments

\*\*\*Complete ex4 using Ex1's Line of Best Fit Equation (from 1.4 handout)



$$y = \frac{1}{8}x + 1.6$$

$$y_{L_6} = \frac{1}{8}(\quad) + 1.6$$

$$y_{L_6} = 2.35$$

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Residual Value  

$$R_i = y_i - y_{L_i}$$

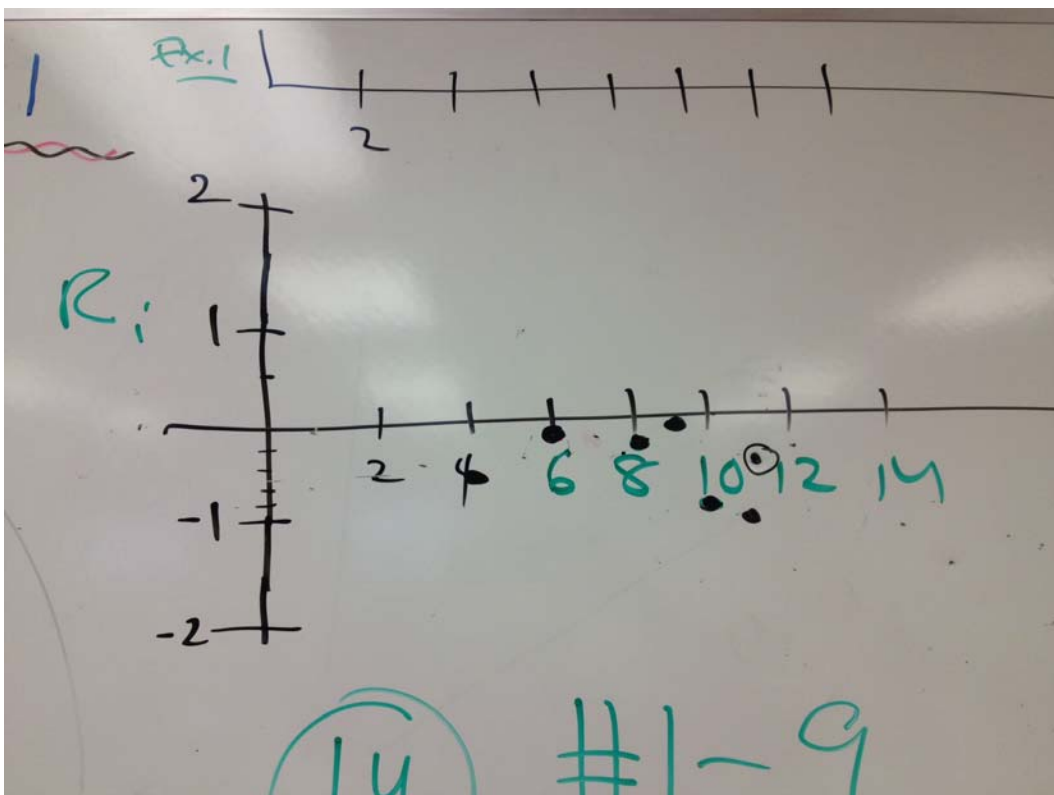
$$R_6 = 2.2 - 2.35$$

$$R_6 = -0.15$$

1.4 Ex. 4

mean temp. (°C)	wheat yield (t/ha)	$y_L = \frac{1}{8}x + 1.6$	Residual Value ( $R_i$ )
4	1.6	2.1	-0.5
8	2.4	2.6	-0.2
10	2.0	2.85	-0.85
9	2.6	2.725	-0.125
11	2.1	2.975	-0.875
6	2.2	2.35	-0.15

$\sum R_i = -2.7$



St4

Wdyle?

(1) all (-) residuals

all points are below LOBF

(2) according to the SP-LOBF -  $\left. \begin{array}{l} 3 \text{ above} \\ 1 \text{ on} \\ 2 \text{ below} \end{array} \right\}$

4.9

(3) at  $x=6$   $y=2.2$   
on LOBF

at  $x=6$   $y_L=1.8$

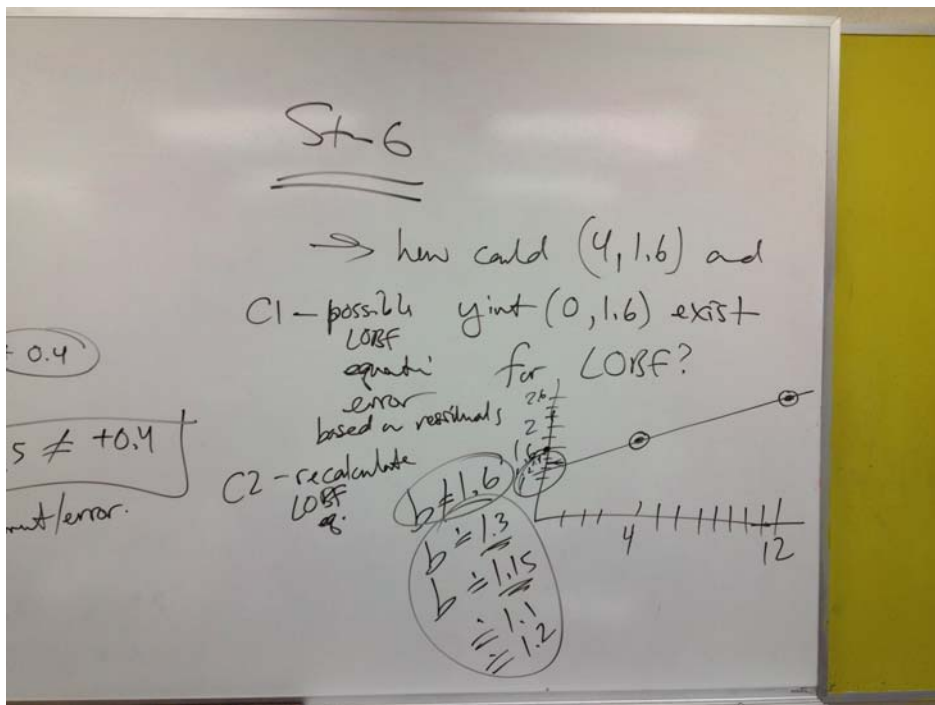
$$R_{x=6} = 2.2 - 1.8 = +0.4$$

visual check

$$R_6 = -0.15 \neq +0.4$$

\* adjustment/error.

C2



C3 →  $\sum R_i = 0$  = +/- close to zero.

C4 →  $\uparrow |\sum R_i|$  |  $\uparrow$  Scatterness  
 (wide dispersed  
 closely dispersed)

C5 →  $\uparrow |\sum R_i|$  the weaker correlation → no correlation.

(1.4) #1-9.  
 (1.5) #1-3

- \*\*\* The smaller the residual sum the greater the correlation
- \*The greater the residual sum, the weaker the correlation or no correlation or another model may be more appropriate

## Classwork/Homework:

- 1.4 pg51 #3 to 9.
- 1.5 pg60 #1 to 3.