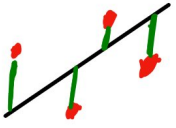


Residuals

- difference between actual y -value and the predicted y -value (regression equation) ^(data)



- How much the data deviates from the line

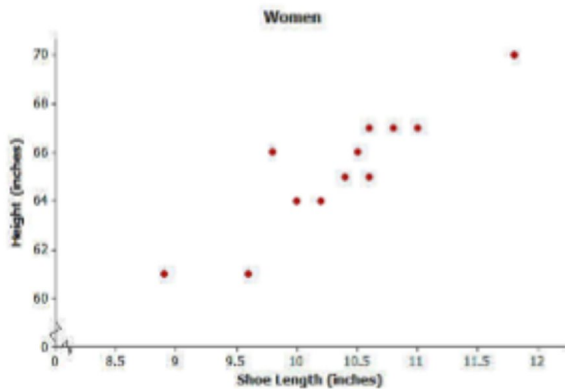
➤ A good best-fit line will have

No pattern in the residual plot

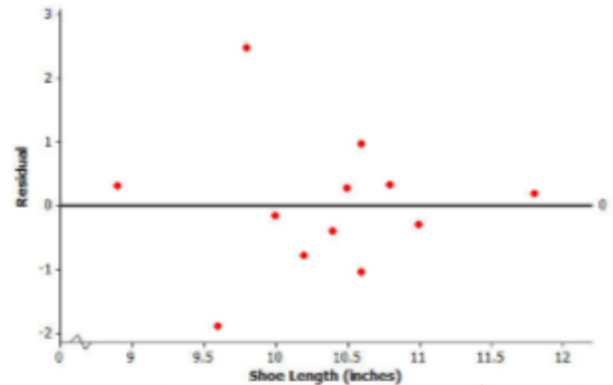
➤ The Sum of the Residuals provides an idea of the degree of accuracy

- The closer the sum is to zero, the more reliable the prediction MAY be

Example:



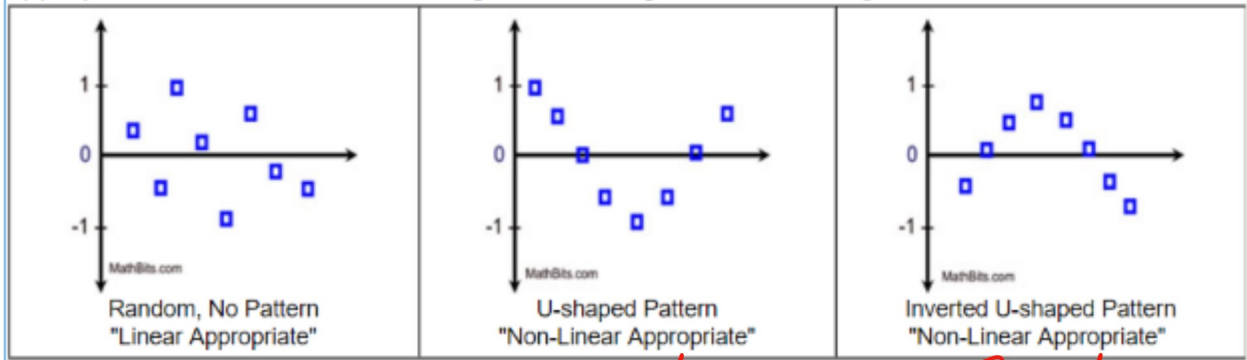
x -values are inputs
 y -values are outputs



x -values are inputs
 y -value is the residual

Characteristics of a residual plot that implies there is a linear relationship are:

- no odd patterns
- looks scattered
- points are equally represented above and below



Good

Bad

Bad

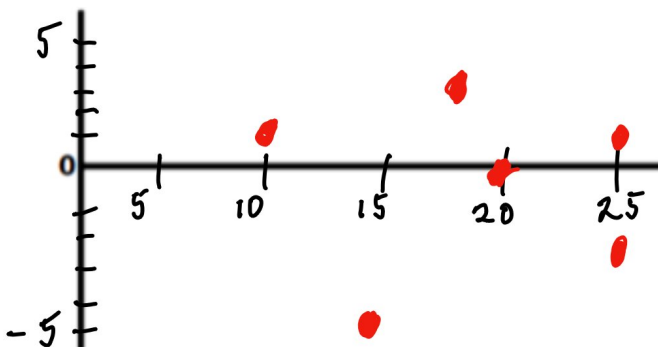
Calculating:

The line of fit for the following data is $y = x + 9$. Find the sum of the residuals.

x	y Actual	y Predicted	Residual
10	20	19	1
15	19	24	-5
18	30	27	3
20	29	29	0
25	31	34	-3
25	35	34	1
Sum of the Residuals →			-3

$$y_{\text{actual}} - y_{\text{predicted}}$$

$$y - \hat{y}$$

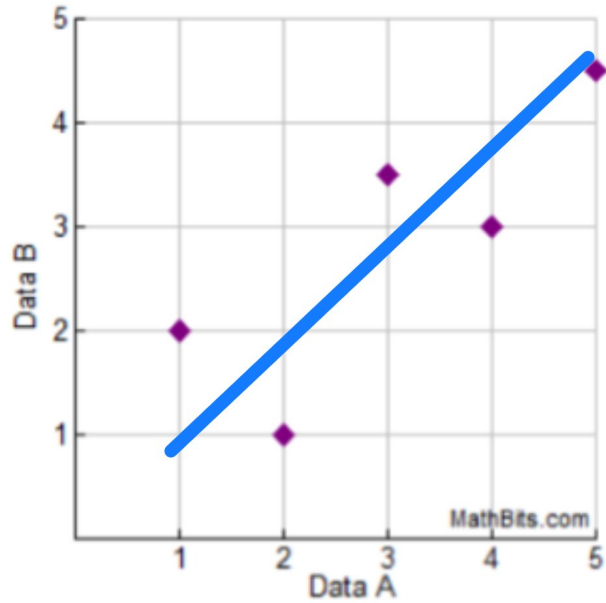


Good Fit.

Use the graphing calculator to find the linear model for the following points:

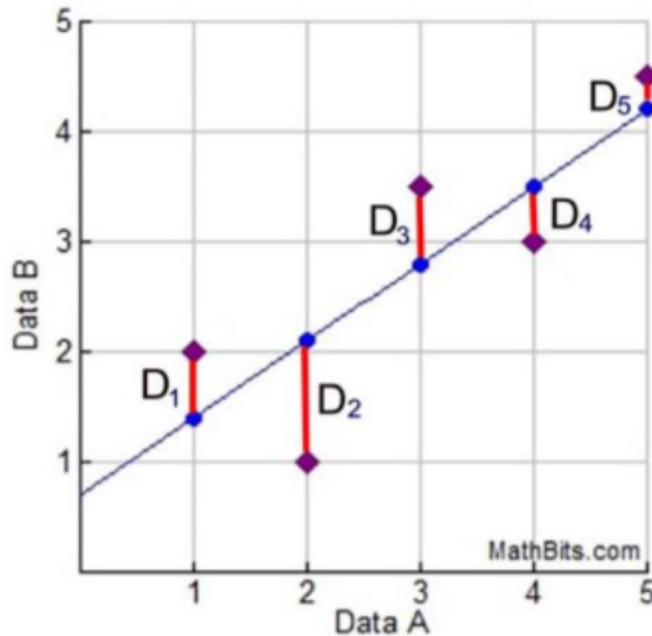
$\{(1,2), (2,1), (3,3\frac{1}{2}), (4,3), (5,4\frac{1}{2})\}$

x	y	y_{Pred}	Resid
1	2	1.4	.6
2	1	2.1	-1.1
3	3.5	2.8	.7
4	3	3.5	-.5
5	4.5	4.2	.3
			0



$$y = .7x + .7$$

$$r = .82$$




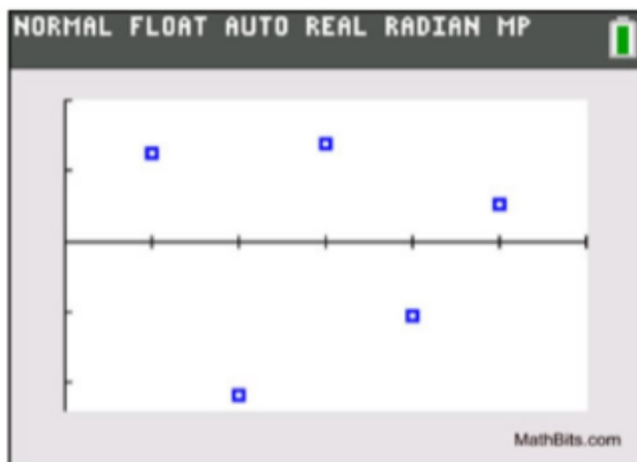
◆ Scatter Plot Points:
 $\{(1,2), (2,1), (3,3\frac{1}{2}), (4,3), (5,4)\}$

● Regression Points
 $\{(1,1.4), (2,2.1), (3,2.8), (4,3.5), (5,4.2)\}$

The Red Line Segments:

The red line segments represent the distances between the y-values of the actual scatter plot points, and the y-values of the regression equation at those points.

The lengths of the red line segments are called **RESIDUALS**. 



Analyze the the residual plot for the same data as above.

1. Turn on Plot2 under the STAT PLOT menu
2. Use L1 for the Xlist and RESID ofr the Ylist
3. Get RESID by pressing 2nd [STAT] and select RESID from the list of names
4. Graph the residuals by pressing [ZOOM] and choosing ZoomStat (9)

Is there a pattern?