Module 8 Regression

1. The data are collected at the end of an introductory statistics course. The table shows the data for the eight males in the class on these variables and on the number of class lectures for the course that the student reported skipping during the term.

Student	Study Time	GPA	Skipped
1	14	2.8	9
2	25	3.6	0
3	15	3.4	2
4	5	3.0	5
5	10	3.1	3
6	12	3.3	2
7	5	2.7	12
8	21	3.8	1

(a) Investigate the relationship between x=study time and y=GPA. Find the prediction equation and interpret the slope.

(b) Find the predicted GPA for a student who studies 25 hours per week using equation in a).

(c) Find and interpret the residual for Student 2, who reported x=25 using equation in a).

(d) Investigate the relationship between x=number of classes skipped and y=GPA. Find the prediction equation and interpret the slope.

(e) Find the predicted GPA and residual for Student 1 equation in d).

Solution:

(a) Predicted GPA $= 2.63 + 0.0439 \times$ Study time. For every one-hour increase in study time per week, GPA is predicted to increase by about 0.04 points.

(b) $2.63 + 0.0439 \times 25 = 3.73$

(c) Residual= $3.6 - 3.73 = -0.13$. The observed GPA for Student 2, who studies an average of 25 hours per week, is 3.6 which is 0.13 points below the predicted GPA of 3.73.

(d) Predicted Predicted GPA $= 3.56 - 0.0820 \times$ classes skipped. For every one class increase in skipped classes, GPA is predicted to decrease by about 0.08 points.

(e) Predicted GPA for Student 1 is $3.56 - 0.0820 \times 9 = 2.82$. Residual= $2.8 - 2.82 = -0.02$. The observed GPA for Student 1, who skipped 9 classes during the term, is 2.8 which is 0.02 points below the predicted GPA of 2.82.