

LESSON WEEK - 6 PRACTICE QUESTIONS

1. Five observations taken for two variables x and y as follows.

x	y
3	55
12	40
6	55
20	10
14	15

i. Develop a scatter diagram for these data.

ii. What does the scatter diagram developed in part (a) indicate about the relationship between the two variables?

iii. Try to approximate the relationship between x and y by drawing a straight line through the data.

iv. Develop the estimated regression equation by computing the values of a and b .

v. Use the estimated regression equation to predict the value of y when $x = 10$.

2. Brawdy Plastics, Inc., produces plastic seat belt retainers for General Motors at the Brawdy Plastics plant in Buffalo, New York. After final assembly and painting, the parts are placed on a conveyor belt that moves the parts past a final inspection station. How fast the parts move past the final inspection station depends upon the line speed of the conveyor belt (feet per minute). Although faster line speeds are desirable, management is concerned that increasing the line speed too much may not provide enough time for inspectors to identify which parts are actually defective. To test this theory, Brawdy Plastics conducted an experiment in which the same batch of parts, with a known number of defective parts, was inspected using a variety of line speeds. The following data were collected.

Line Speed	Number of Defective Parts Found
20	23
20	21
30	19
30	16
40	15
40	17
50	14
50	11

- i. Develop a scatter diagram with the line speed as the independent variable.
- ii. What does the scatter diagram developed in part (a) indicate about the relationship between the two variables?
- iii. Use the least squares method to develop the estimated regression equation.
- iv. Predict the number of defective parts found for a line speed of 25 feet per minute.

3. The following data show the brand, price (\$), and the overall score for six stereo headphones that were tested by Consumer Reports (Consumer Reports website, March 5, 2012). The overall score is based on sound quality and effectiveness of ambient noise reduction. Scores range from 0 (lowest) to 100 (highest). The estimated regression equation for these data is $\hat{y} = 23.194 - 0.318x$, where x is price in \$ and y is overall scores.

Brand	Price (\$)	Score
Bose	180	76
Skullcandy	150	71
Koss	95	61
Phillips/O'Neill	70	56
Denon	70	40
JVC	35	26

- a. Compute SST, SSR, and SSE.
- b. Compute the coefficient of determination r^2 . Comment on the goodness of fit.
- c. What is the value of the sample correlation coefficient?