SOLUTIONS

King Fahd University of Petroleum & Minerals
Department of Mathematics & Statistics
STAT-212-Term063-Quiz5

Name: ID: Serial:

The following data set represent the price in dollars and demand in thousand KG for a commodity:

Price (**y**)	20	60	100	140	180	220	260	300	340	380
Demand(**x**)	0.18	0.37	0.35	0.78	0.56	0.75	1.18	1.36	1.17	1.65

$\sum x_i = 8.35, \sum y_i = 2000, \sum x_i^2 = 9.1097, \sum y_i^2 = 532000, \sum x_i y_i = 2175.4,$
$\bar{x} = 0.835, \bar{y} = 200$

(3+4+3=10-Points)

a. Determine the equation of the least squares line.

$$b_1 = \frac{2175.4 - \frac{(8.35)(2000)}{10}}{9.1097 - \frac{(8.35)^2}{10}} = \frac{505.4}{2.13745} = 236.45$$

$$b_0 = 200 - 236.45(0.835) = 2.56425$$

The equation is: $\hat{y} = 2.56425 + 236.45x$

b. Calculate the **correlation coefficient**, and **interpret** its value.

$$r = \frac{(10)(2175.4) - (8.35)(2000)}{\sqrt{(10)(9.1097) - (8.35)^2}\sqrt{(10)(532000) - (2000)^2}} = \frac{5054}{5311.7172} = 0.9515$$

Interpretation: There is a strong positive linear relationship between the price and demand

c. Calculate the e**stimated value** of y when $x = 0.56$, and find the **error** in estimation

$$\hat{y}(0.56) = 2.56425 + 236.45(0.56) = 134.9763$$

$$\text{Error} = y_i - \hat{y}_i = 180 - 134.9763 = 45.0237$$