AP® Statistics
2002 Sample Student Responses

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(a) What is the equation of the least squares regression line that describes the relationship between operating cost per hour and number of passenger seats in the plane? Define any variables used in this equation.

$\hat{y} = 1136 + 14.673x$

y = operating cost per hour

x = # of passenger seats

(b) What is the value of the correlation coefficient for operating cost per hour and number of passenger seats in the plane? Interpret this correlation.

Correlation coefficient = $r = \sqrt{.57} = .755$

There is a pretty strong, positive relationship between # of passenger seats and operating cost per hour.

r^2 = coefficient of determination = .57 57% of the variability in operating cost per hour can be attributed to its linear relationship to the # of passenger seats.

(c) Suppose that you want to describe the relationship between operating cost per hour and number of passenger seats in the plane for planes only in the range of 250 to 350 seats. Does the line shown in the scatterplot still provide the best description of the relationship for data in this range? Why or why not?

No, because within this range on the scatter plot there is a negative relationship between operating cost per hour and the number of passenger seats.

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(a) What is the equation of the least squares regression line that describes the relationship between operating cost per hour and number of passenger seats in the plane? Define any variables used in this equation.

$= b_0 + b_1 x$)

estimated points (399, 6900) and (270, 5100) close to line

$$m = \frac{6900 - 5100}{399 - 270} = 13.953$$

$$\hat{y} - 5100 = 13.953(x - 270) \qquad \hat{y} = 13.953x + 1332.69$$

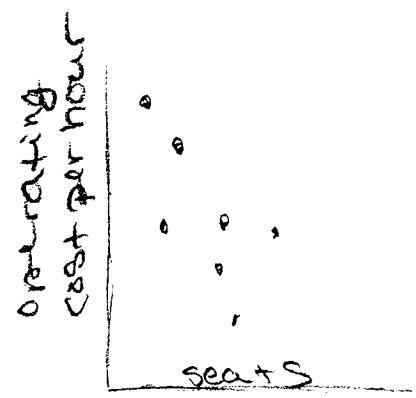
(b) What is the value of the correlation coefficient for operating cost per hour and number of passenger seats in the plane? Interpret this correlation.

correlation coefficient = $\sqrt{r^2} = \sqrt{.57} = .755$

There is a strong positive correlation between operating cost per hour and the number of passenger seats; as the number of seats increases, cost increases. This does NOT mean that an increase in seats causes an increase in cost, however.

(c) Suppose that you want to describe the relationship between operating cost per hour and number of passenger seats in the plane for planes only in the range of 250 to 350 seats. Does the line shown in the scatterplot still provide the best description of the relationship for data in this range? Why or why not?

No, the line shown in the scatterplot no longer provides the best description of the relationship for data. Observing the plot in that range would eliminate five values, and it would look like this:



clearly the correlation is now strongly negative rather than strongly positive.

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