

I. The table to your right gives the horsepower ratings and expected gas mileage for several 2001 vehicles. Please answer the following questions using this data. (16 points total)

(a) Create a scatter plot of the data on the axes provided below. (3 points)

(b) Find the centroid of the data and plot it on your scatter plot. Clearly indicate this point below and on the plot. (1 point)

(c) Find the equation of the least-squares regression line for this data and accurately plot the line on your scatter plot below. Note that the vertical axis is located at 100 hp. Clearly indicate the equation of the line below. (3 points)

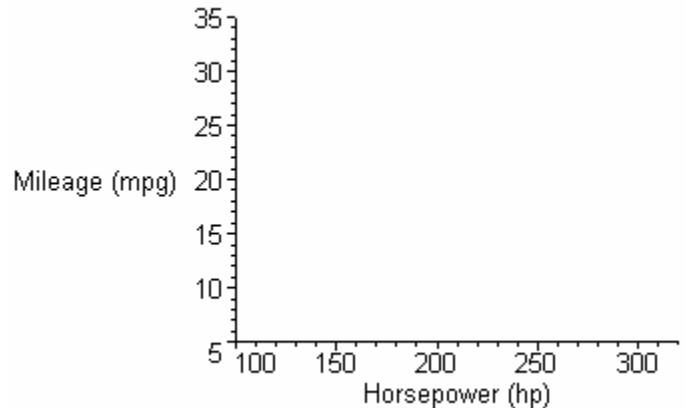
(d) Use the regression line computed in part (c) to estimate the expected gas mileage of vehicles that have a horsepower rating of 250 hp. Show this estimation graphically on your scatterplot. (2 points)

(e) What is the residual (or prediction error) for the data point (190, 15)? (2 points)

(f) Complete the following sentences (5 points):

- The percent of the variation in gas mileage that is explained by horsepower, via this model, is _____ percent.
- An increase by 1 hp in horsepower results in an (circle one) increase/decrease of _____mpg in gas mileage, on average.
- An increase of 1 standard deviation in horsepower results in an (circle one) increase/decrease of _____standard deviations in gas mileage, on average.

Vehicle	Horsepower (hp)	Gas Mileage (mpg)
Audi A4	170	22
Buick LeSabre	205	20
Chevy Blazer	190	15
Chevy Prizm	125	31
Ford Excursion	310	10
GMC Yukon	285	13
Honda Civic	127	29
Hyundai Elantra	140	25
Lexus 300	215	21
Lincoln LS	210	23
Mazda MPV	170	18
Olds Alero	140	23
Toyota Camry	194	21
VW Beetle	115	29



II. Short Answer and True/False. (4 points total)

1. The Environmental Protection Agency records data on the fuel economy of many different makes of cars. They are interested in determining if one could predict the mileage of the car (in miles per gallon) from the weight of the car (in lbs.). Which variable is the response variable in this study? (1 point)

2. Please write “true” or “false” according to which is correct in the blank provided next to each statement. (1 point each – 3 total)

_____ The correlation coefficient will be -1.0 if all the data points lie on a line with slope equal to -1.

_____ The correlation coefficient measures the strength of a *linear* relationship that may be present between two quantitative variables.

_____ If the association between two quantitative variables is positive and very strong, then the correlation coefficient may be greater than 1.0.