Problem 1 Solution

a. Make a scatterplot appropriate for predicting soda price from hot dog price. Describe the relationship. [6pts]
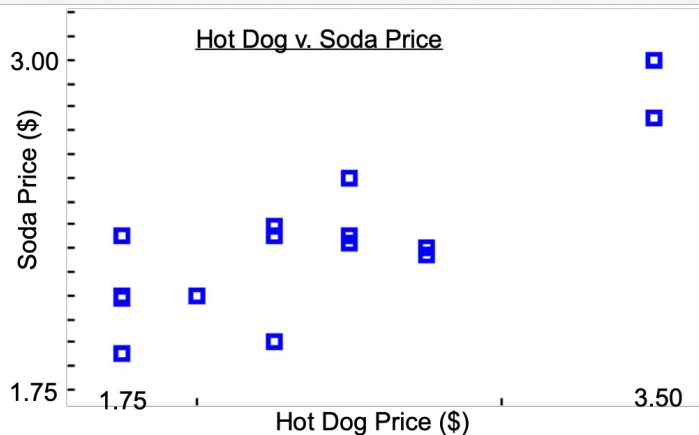
1pt for scatterplot
1pt for labeling window on scatterplot

Discuss
1pt • strength
1pt • form (linear vs. non-linear)
1pt • direction (positive vs. negative)
1pt • explain in context
(as hot dog goes up, so does soda price)

b. Find the correlation between hot dog price and soda price. Explain this value. [3pts]

1pt r = #

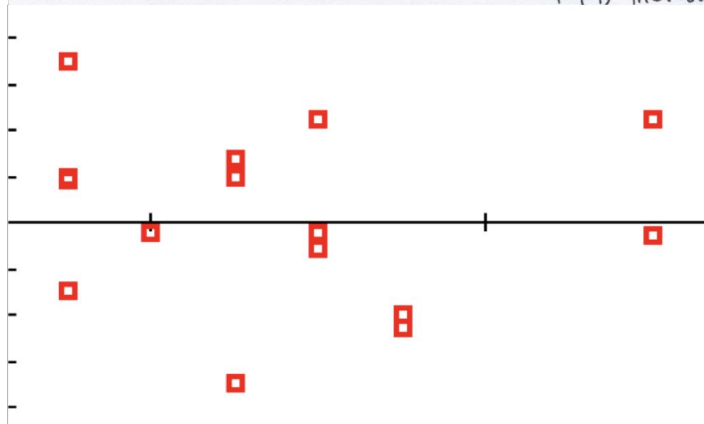1pt relatively strong relationship b/w hot dog & soda prices
1pt b/c close to 1

Hot Dog v. Soda Price

(y-axis: Soda Price ($), from 1.75 to 3.00)
(x-axis: Hot Dog Price ($), from 1.75 to 3.50)

c. Find the coefficient of determination (r^2). Interpret this value. [3pts]

$r^2 = \#$ ← 1pt

_____% of the variation in the predicted soda prices can be explained by LSRL or hot dog prices ← context 1pt

d. Find the equation of the least-squares regression line for predicting soda price from hot dog price. [3pts]

1pt $\hat{y} = $ _____ + _____ x

← 1pt

where x represents the price of a hot dog & $\hat{y}$ represents the predicted soda price. ← 1pt

e. Explain carefully what the intercept of the LSRL tells us. [2pts]

remember to write in context! −1 for no context

When a hot dog is free (cost $0), then the predicted soda cost $_____.

f. Discuss how well the LSRL fits the data. [5pts]

• r^2
• residual plot } these two help us discuss the fit of an LSRL.

1pt ① Since r^2 is close to 1 explain why it is good.

1pt ② Since no clear pattern to residual plot explaining why it is good

1pt ③ Conclude: Pretty good fit

2pt ④ Include residual plot

always provide proof so I'm not just trusting that you did it or that you are making it up!

2. It is usual in finance to describe the returns from investing in a single stock by regressing the stock's return from the stock market as a whole. This helps us see how closely the stock follows the market. We examine the total monthly percent return on Facebook stock, y, and the monthly percent return on the S & P, x, (which represents the market), for the period between July 1990 and May 1997. Here are the results:

$\bar{x} = 1.304$ $s_x = 3.392$ $\bar{y} = 1.878$ $s_y = 7.554$ $r = 0.5251$

A scatterplot shows no very influential observations.

   a.   Find the equation for the LSRL.

y-hat = 0.353 + 1.169x where x: monthly % return for S&P and y-hat is predicted monthly % return for FB <-- use the Green Packet formulas

   b.   Explain carefully what the slope of the line tells us about how Facebook stock responds to changes in the market.

As S&P monthly return increases by 1%, FB monthly return is predicted to increase by 1.169%.

   c.   Predict the percent monthly return for Facebook if the S&P monthly percent return was 2.1.

y-hat = 0.353 + 1.169(2.1) = 2.808%.