Name:_____ Ch 3 Graded Assignment

Hardware stores sell traps that lure yellow jackets to them using soft drinks or sugared water. Once they're in the trap, they can't get out and they die. The number of yellow jackets caught varies directly with the temperature that particular day. Here is the data collected over a two week period, checking the trap each day as well as recording the high temperature for the day.

Temp (F)	78	85	77	95	97	88	98	90	81	96
# of yellow jackets	16	18	15	20	22	20	27	23	16	25

1. Graph the data to verify a linear relationship between these two variables. Does the scatterplot appear linear?

2. Calculate the correlation coefficient. What direction is the relationship and how strong is it?

3. What proportion of the variation in the number of yellow jackets caught is explained by temperature?

4. Now find the equation of the Least Squares regression line. Interpret the slope and the y-intercept in the context of the problem.

5. Now use the equation of the LSRL to predict the number of yellow jackets caught when the temperature is 80˚, 75˚, 50˚, and 30˚. Comment on your results.

2. Fill in the missing information in the table below:

$\bar{x}$	s_x	$\bar{y}$	s_y	r	$\hat{y} = a + bx$
10	2	20	3	0.5	
12	6			-0.8	$\hat{y} = 200 - 4x$
2.5	1.2		100		$\hat{y} = -100 + 50x$
		18	4	-0.6	$\hat{y} = 30 - 2x$

3) The following chart shows the association between the amounts of fat and calories in fast food hamburgers:

Fat (g)	19	31	34	35	39	39	43
Calories	410	580	590	570	640	680	660

a) Create a scatterplot of calories vs fat content. Interpret the value of r^2 in this context.

b) Write the equation of the line of regression. Explain the meaning of the slope and y-intercept in context.

c) Sketch the residuals plot and comment whether your linear model is appropriate.

d) A new burger containing 28 grams of fat and 500 calories is introduced. Use your LSRL to find the residual for this new burger.

5) After keeping track of his heating expenses for several winters, a homeowner believes he can estimate the monthly cost C from the average daily temperature (in F) using the model $\hat{C} = 133 - 2.13(temp)$. The residuals plot for his data is shown.

a) During the months when the temperature stays around freezing, would you expect cost predictions based on this model to be accurate, too low or too high? Explain.

b) What heating cost does the model predict for a month that averages 10°?

c) During one of the months on which the model is based, the temperature did average 10°. What were the actual heating costs for that month?