Lab Assignment 5 Math 220

1. For the following data set, test whether internet connection type is independent of community type.

	Internet	Internet
Community Type	Have broadband	No broadband
Urban	300	276
Suburban	521	542
Rural	174	387

Find the chi-square test statistic, the d.f. and the p-value for the test. Using $\alpha = 0.05$, what is your conclusion?

H_0 : Internet connection type and community type are independent.

H_1 : Internet connection type and community type are not independent.

Based on the SPSS output, $\chi^2 = 62.813, d.f. = 2$, P-value $= 0.000$

Since the P-value < 0.05, we reject H_0. There is sufficient evidence that internet connection type and community type are dependent. In fact, a household in urban and suburban areas is more likely to have broadband than in rural areas.

community * internet Crosstabulation

			internet		
			b	nb	Total
community	rural	Count	174	387	561
		Expected Count	253.7	307.3	561.0
		% within community	31.0%	69.0%	100.0%
	sub	Count	521	542	1063
		Expected Count	480.8	582.2	1063.0
		% within community	49.0%	51.0%	100.0%
	urban	Count	300	276	576
		Expected Count	260.5	315.5	576.0
		% within community	52.1%	47.9%	100.0%
Total		Count	995	1205	2200
		Expected Count	995.0	1205.0	2200.0
		% within community	45.2%	54.8%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	62.813[a]	2	.000
Likelihood Ratio	64.275	2	.000
N of Valid Cases	2200		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 253.73.

2. Researchers laid out 12 circular plots in an area where beavers were cutting down cottonwood trees. In each plot, they counted the stumps from trees cut by beavers and the number of clusters of beetle larvae. Ecologists think that the new sprout from stumps are more tender so that beetle prefer them. If so, more stumps should produce more beetle larvae. Here are the data.

stumps x	2	2	1	3	3	4	3	1	2	5	1	3
beetle larvae y	10	30	12	24	36	40	43	11	27	56	18	40

1). Make a scatter plot by SPSS. What kind of pattern do you see in the scatter plot? You do not need to display the scatter plot. Just state what kind of pattern you see (e.g., positive or negative relationship, a linear or nonlinear pattern)

We observe a positive, linear pattern in the scatter plot.

2). Find the linear correlation between x and y.

$r = 0.885$.

3). Find the linear regression equation between x and y.

$\hat{y} = 2.961 + 10.382x$. Note the constant in the SPSS output is the