Homework # 2, Stat 526, Fall 2008

1. The following table was reported by Cloggy and Shockey (1988) for the 1982 General Social Survey.

Gun	Death Penalty	
Registration	Favor	Oppose
Favor	784	236
Oppose	311	66

   (a) Test independence by two sample binomial method and odds ratio respectively.

   (b) Derive a 95% confidence interval for the odds ratio.

   (c) Interpret your result based on the odds ratio.

2. The following table describes number of cases for a breathing testing result between smoking status by age groups, as group 1 is below 40 years old and group 2 is between 40 and 59 years old, in Houston in 1974-1975.

Age	Smoking	Breathing Test Results		
		Normal	Not Normal	Total
< 40	Non Smoker	577	34	611
	Smoker	682	57	739
$40 - 59$	Non Smoker	164	4	168
	Smoker	245	74	319

   (a) Estimate the odds ratios, give 95% confidence intervals and test independence for age less than 40 and age between 40 and 59 respectively.

   (b) Combine the age groups. Estimate the odds ratio, give 95% confidence interval and test independence again.

   (c) Interpret your result.

3. Do a simulation study for type I error probability by **R**. Generate $n_{11} \sim Bin(k_1, p)$ and $n_{21} \sim Bin(k_2, p)$ independently. Let $n_{12} = k_1 - n_{11}$ and $n_{22} = k_2 - n_{21}$. Test the independence by using odds ratio (choose $\alpha = 0.05$). Repeat 10,000 times. Choose $p = 0.5$. Let $k_1 = k_2$ vary from 5 to 100 with increament 1. Give the plot of the rejection rate which is exactly the simulated type I error probability. Interpret the plot by a few sentences. (You need to use the function "rbinom" in **R**).