Question 1

(a)[7 points] A telephone survey of 1040 randomly selected adults found that 313 of them shopped using the internet at least once per year. Give a 99% confidence interval for the proportion of adults who at least once per year shop using the internet. Round to two decimal places.

(b)[3 points] Using a simple random sample of 900 taxpayers, a survey company claimed that with 95% confidence the proportion of taxpayers who gave to charity in the past year was between 0.60 and 0.66. How many of the 900 people surveyed claim to have given to charity in the past year? Round to the nearest person.

Question 2

(a)[6 points] The heart rates of 5000 randomly selected males in the $30-39$ age group had a mean value of 72.8 beats per minute and a standard deviation of 11.5 beats per minute. Give a 99.9% confidence interval for μ, the mean heart rate of all males in the $30-39$ age group. Round your anwer to one decimal.

(b)[4 points] Suppose the standard deviation for heart rates of males in the $30-39$ age group is known to be $\sigma = 11.0$. If determining a 99.9% confidence interval for μ, the mean heart rate of all males in the $30-39$ age group, how large a sample would be required to obtain a margin of error of 2? Round to the nearest person.

Question 3 [10 points] A polling firm surveyed 1024 adults and found that 285 of them smoked cigarettes in the past week. At a 0.05 level of significance, is this sufficient evidence to conclude that more than 25% of adults smoke at least once per week? Clearly state the parameter you are testing as well as the null and the alternative hypothesis.

Question 4 [10 points] It is commonly accepted that humans require (on average) 7.5 hours of sleep per night in order to function effectively. In a study of 144 people who drink four or more cups of coffee per day, study subjects were asked "How many hours did you sleep last night". The average of the responses was 6.9 hours, while the standard deviation was 4.0 hours. Is this sufficient evidence to support the assertion that, on average, those drinking four or more cups of coffee per day sleep less than the standard of 7.5 hours per night? Test at the $\alpha = 0.01$ level. Clearly state the parameter you are testing as well as the null and the alternative hypothesis.

Question 5 [10 points] Introductory Calculus has been taught at UBC for many years and reliable data is available for all those who have taken the course. The distribution of course grades received over the years is normally distributed with a mean $\mu = 68\%$ and standard deviation $\sigma = 14\%$. 80% of all those who have ever taken the course have passed. A new study craze, "Cramming for Calculus", is sweeping the campus, with the idea that the entire course can be mastered in only seven days through intense study following a high priced seminar. Three hundred students who attend the seminar and follow the study program end up with an average grade of 72%; 250 of the 300 students pass the course. Based on these results, can the creators of "Cramming for Calculus" claim that, based on data statistically significant at the $\alpha = 0.05$ level, their program results in higher pass rates compared to conventional study? Clearly state the parameter you are testing as well as the null and the alternative hypothesis.