Math 135 -- Test 4
April 24, 2009 Name _____

Take your time and make sure you follow all instructions. Where necessary, work must be shown in order to receive partial credit. Include input into the calculator in order to receive partial credit.

1. Determine ONLY the H_O and H_A for the following claims. [5 pts each]
   a) An agriculture association claims that the number of farms over 100 acres is more than 25%.

   b) The GoDrink company is selling a new drink called Sunshine. The label says that Sunshine has 32% of the recommended daily allowance of vitamin C. A consumer group claims that the label is not correct.

2. Decide if the following will be True or False under the assumption that everything else remains the same. [2 pts each]
   a) If the sample size is increased the margin of error is increased.

   b) A higher margin of error will result from a lower confidence level.

   c) Halving the sample size will cause the margin of error to be halved.

3. Snowfall in a community is normally distributed with a mean of 32.4 inches per year and a standard deviation of 5.7 inches. If a random sample of 9 years is taken what is the probability the mean snowfall for the years is greater than 36 inches. Be sure to check the necessary conditions. [15 pts]

4. When a patient goes to a doctor's office and claims they have flu like symptoms many doctors will administer an influenza test to see if the patient is suffering from the flu. If the patient tests positive then they will be given a prescription for an anti-viral drug. If they test negative they will be told to go home and use over the counter drugs to treat the symptoms. [5 pts each]

   a) In this context, what would a Type I error be?

   b) In this context, what would a Type II error be?

5. An educational publication wants to estimate the proportion of graduates in the nation that take more than five years to graduate. How large a sample would need to be contacted to estimate within 3.5 percentage points with 99% confidence? [15 pts]

6. Epizootic hemorrhagic disease (EHD for short) is a disease that causes death in white-tailed deer throughout the United States. It is transmitted when a deer is bitten by an infected insect called a midge. New cases of EHD end once the first frost occurs, and the insects are killed for the season. To estimate the percent of deer infected with EHD in Kentucky for a given year, state wildlife biologists randomly select 120 deer in Kentucky. Twenty-four of the selected deer have the disease. (a) Give a 95% confidence interval for the proportion of all deer in Kentucky that are infected with EHD. Construct the interval by hand, but your calculator can be used to check your results. Make sure the appropriate conditions are met. (b) Would the biologist be justified in saying that less than 25% of all deer in Kentucky are infected with EHD? Why or Why not? [15 pts]

7. A newspaper reports that less than 40% of residents support the building of a maximum security prison near the community. To test this claim 150 residents are randomly selected and 54 are found to support the construction. Perform a 5% test using the given hypothesis. Make sure the appropriate conditions are met, show the work for calculating the test statistics, show the *p*-value, and write a conclusion.

[30 pts]