Hypothesis Test Setup Practice

For each of the scenarios below, set up the first four parts of the hypothesis test. In other words, specify the Null Hypothesis, the Alternative Hypothesis, the Test Statistic and the Rejection Criterion.

1. A mouthwash manufacturer claims its product has a mean alcohol content of 27%. A private lab has been hired to test the product. A random sample of 121 bottles of the stuff will be taken and the sample mean alcohol content will be computed. Previous history indicates that the population standard deviation should be $\sigma = 2\%$. Set up the two-tailed hypothesis test to test the manufacturer's claim at the 10% level of significance.

   Ho: Ha:

   Test Statistic:

   Rejection Criterion:

2. Trailer axles made by a company in Bluffton need to have a mean diameter of 1.5 inches. A check of 37 randomly selected axles will be used to test whether the mean diameter is indeed 1.5 inches. Set up the first four parts of an hypothesis test at the 5% level of significance to see if μ is 1.5 inches. Note that there is no information on the expected population standard deviation, so the sample standard deviation will have to be used in the calculation.

3. A campaign manager claims that his candidate, Ms. Officeholder, has at least 40% of the voting public on her side. But some workers in the Officeholder campaign headquarters think the manager is overestimating the candidate's voter appeal. They want to spend additional funds on radio and TV spots to enhance the candidate's chances of getting into the runoff. They have asked the intern to poll 225 randomly selected voters with the question "Do you intend to support Officeholder in the primary?". Set up the first four parts of the hypothesis test that the intern will need to run to test the manager's claim at the 5% level of significance.

4. A tire dealer claims his competitor's tires won't last 40,000 miles, on average. The competitor sues the dealer and the courts order the dealer to back up his claim with statistical evidence or pay a fine. They instruct the dealer to (a) purchase 36 of the competitor's tires, (b) run them until they fail to pass the DMV test, and (c) test the claim with the data from the DMV using a 5% level of significance. Set up the first four parts of the hypothesis test he must use.