NAME: _____

1. **(15 points)** It often happens that when an hypothesis test is conducted which rejects the null hypothesis in favor of the alternative at the usual significance level (such as 0.05), researchers say that "the alternative hypothesis is proved." Is it accurate to say this? Justify your answer.

2. The marketing department of a large corporation wants to test the effectiveness of two advertizing methods in obtaining customer inquiries about a certain product. To do so, they contact a random sample of 20,000 potential customers by method 1 and receive inquiries from 237 potential customers, and contact a random sample of 10,000 potential customers by method 2 and receive inquiries from 159 potential customers.

Conduct an hypothesis test, at the 0.01 level of significance, to compare the effectiveness of the two methods. Be sure to state the scientific hypothesis, the statistical model, the statistical hypotheses, the p-value, the outcome of the hypothesis test, and your conclusions. Be sure to show any needed assumptions are satisfied.

(a) **(10 points)** The scientific hypothesis.

(b) **(10 points)** The statistical model.

(c) **(10 points)** The statistical hypotheses being tested.

(d) **(10 points)** The standardized test statistic being used.

(e) **(10 points)** The p-value.

(f) **(10 points)** The assumptions made.

(g) **(10 points)** Your conclusions.

3. **(15 points)** A random sample from the C+E model has mean 2.457 and standard deviation 15.5. A large-sample test of

$$
\begin{aligned}
H_0: \quad \mu &= 1 \\
H_a: \quad \mu &> 1,
\end{aligned}
$$

gives a p-value 0.0024. What is the sample size?