MATH 115
SPRING 2017 NAME:
EXAM 4

1. [10 pts. each] The drug apixaban is used to help prevent blood clots in some patients. In clinical trials, among 5924 patients treated with apixaban, 153 developed the adverse reaction of nausea.
   (a) Construct a 90% confidence interval for the proportion of patients who experience nausea with apixaban.
   (b) Construct a 99% confidence interval for the proportion of patients who experience nausea with apixaban.

2. [10 pts. each] You wish to estimate, with 95% confidence, the population proportion of U.S. adults who think that foods containing genetically modified ingredients should be labeled. Your estimate must be within 3% of the population proportion.
   (a) Find the minimum sample size needed if no preliminary estimate is available.
   (b) Find the minimum sample size needed if a prior study found that 83% of U.S. adults thinks that foods containing genetically modified ingredients should be labeled.

3. [15 pts.] The following are speeds (in miles per hour) measured from southbound traffic on I-280 near Cupertino, California:

62	71	61	57	61	54
59	58	59	69	60	67

   Assuming the sample is from a normally distributed population, construct a 98% confidence interval for the population standard deviation σ, and also for the population variance.

4. [4 pts. each] A company that makes cola drinks states that the mean caffeine content per 12-ounce bottle of cola is at most 40 mg. A random sample of twenty 12-ounce bottles of cola is found to have a mean caffeine content of 41.1 mg. Assume the population is normally distributed and the population standard deviation is 7.5 mg. Let $\alpha = 0.01$.
   (a) State H_0 and H_a, identifying the claim.
   (b) Find the critical value(s).
   (c) Identify the rejection region.
   (d) Find the standardized test statistic.
   (e) Can the company's claim be rejected?

5. [4 pts. each] A manufacturer claims that the mean battery life of its MP3 players is 30 hours. A random sample of 18 MP3 players is found to have a mean battery life of 28.5 hours and a standard deviation of 1.7 hours. Assume the population is normally distributed, and let $\alpha = 0.01$.

   (a) State H_0 and H_a, identifying the claim.

   (b) Find the critical value(s).

   (c) Identify the rejection region.

   (d) Find the standardized test statistic.

   (e) Can the manufacturer's claim be rejected?

6. [4 pts. each] When Mendel conducted his celebrated genetics experiments with peas, one sample of offspring consisted of 428 green peas and 152 yellow peas. Use a 0.01 significance level to test Mendel's claim that under the same circumstances, over 25% of offspring peas will be yellow.

   (a) State H_0 and H_a, identifying the claim.

   (b) Find the critical value(s).

   (c) Identify the rejection region.

   (d) Find the standardized test statistic.

   (e) Can Mendel's claim be rejected?