**AP Statistics Name:  
Special Problem 4 (S2017)**

**Directions**: *This is an individual assignment*. You may use your book and notes but you are not to use any other sources including the internet. Show all your work. Indicate the methods you use, because you will be graded on the correctness of your methods as well as on the accuracy and completeness of your results and explanations.

**Problem 1**: A school district in central Massachusetts is considering changing the district lines. This might result in some students having to change schools next year. There are 2500 students (includes elementary, middle, and high schools) in the district. The administration would like to survey the students to estimate the proportion of students who are satisfied with the redistricting plan.

1. Describe a simple random sampling procedure that the district could use to select 200 students from the 2500 students in the district.
2. If a stratified random sample is to be drawn, give one example of an effective variable on which to stratify the survey. Explain your reasoning.
3. Describe one statistical advantage of using a stratified random sample over a simple random sample in the context of this situation.

**Problem 2.** When dogs grow older, they may begin to have hip and joint pain which reduces a dog’s activity level. This reduction can lead to other health concerns due to lack of exercise. A study is to be conducted to see which of two different dietary supplements, A or B, is more effective in reducing canine osteoarthritis. Researchers will randomly select 240 dogs from ten different veterinary clinics from around the United States. All of the dogs are more than 7 years old. Changes in joint and hip health will be evaluated for 6 months of treatment.

(a) What is an advantage of adding a control group in the design of this study?

(b) Assuming a control group is added to the other two groups, explain how you would assign the 240 dogs to these three groups for a completely randomized design.

(c) Instead of using a completely randomized design, one group of researchers proposes blocking on clinics, and another group proposes blocking on dog breed. How would you decide which one of these two variables is the blocking variable?