Stat 446 **Name:** _____
In class midterm
10/12/2016

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1. The Procrastinator Theater is interested in estimating the total number of Bozeman residents (both MSU students and town citizens) that would attend movies over the summer.

   (a) (8 points) The director of the theater tells you they plan to conduct a SRS of Bozeman residents, but do not know how many respondents they will need to poll. The director recalls seeing a formula in STAT 446, $Pr(|\theta - \hat{\theta}| > d) < \alpha$, but doesn't understand what it means. What information will you need to help them compute the sample size? (be specific)

   (b) (6 points) You end up calculating a sample size of 4,000 and it turns out there are 40,000 residents of Bozeman. Of the 4,000 included in the sample, 803 say they would attend movies at the Procrastinator during the summer. Estimate the total number of Bozeman residents that would attend summer movies at the Procrastinator.

   (c) (6 points) When analyzing the data you realize all of the respondents are MSU students, what issues does this present for your answer to the previous question?

   (d) (6 points) The researchers are willing to sample 4,000 more respondents in an attempt to remedy the issue in the previous question. How do you suggest collecting samples to come up with a more accurate estimate for the total number of moviegoers in Bozeman?

Short Answer Questions:

Choose five questions to answer by circling the number next to the questions you would like to have graded. If you do not do this, the first five you answer will be graded. For the short answer questions please try to keep your answers to a maximum of 3-4 sentences

1. (4 points) Give an example of a situation where the sampled population and the target population are not the same.

2. (4 points) Give an example of a sample with undercoverage.

3. (4 points) Describe a scenario where a stratified sampling scheme would be useful.

4. (4 points) What is the purpose of the finite population correction?

5. (4 points) In talking about the uncertainty in an estimator, why might a researcher prefer to use the coefficient of variation rather than the standard deviation?

6. (4 points) What is the stratification principle?

7. (4 points) The population variance, S^2 is an integral part of computing confidence intervals of estimators, but this is usually unknown. What is the typical solution?