1. Suppose we have a sample of size \( n \) from a geometric distribution.
   (a) What is the method of moments estimator for the parameter \( p \)?
   (b) What is the MLE estimator for the parameter \( p \)?

2. It is thought that sleep is the key to good learning. Suppose two samples are taken. A sample of 36 Deans list students reveal they get an average of 7 hours of sleep a night with sample variance .5. A sample of 36 non Deans list students reveals they get an average of 6.75 hours of sleep a night with sample variance .5.
   (a) At the .05 level is there evidence to suggest that Deans list students get a different amount of sleep than non Deans list students?
   (b) What is the p-value of this test.
   (c) Suppose we have reason to believe non Deans list students actually get a difference of half an hour sleep. Using this alternative hypothesis what is \( \beta \)?

3. Suppose we want to test if a coin is biased. Suppose we flip the coin 100 times.
   (a) Give a rejection region for a .05 level test.
   (b) Suppose we have reason to believe the bias of the coin is .8, what is \( \beta \) for this value?

4. Suppose we want to test the hypothesis \( H_0 : \mu = 10 \) versus \( H_a : \mu = 5 \) from a Normal distribution with mean \( \mu \) and variance 25. How many samples must we take so that the most powerful test will have error rates \( \alpha = \beta = .025 \)?