

Assignment #9 — Due Monday, November 28 by 4:00 P.M.

Turn in homework to your TA's mailbox using this sheet as the cover page.

Fill in your name and also circle the *lecture section in which you are registered* and circle the *discussion section you expect to attend* to pick up this assignment.

Name:

Lecture 1 (Hanlon). **311:** Tu 1:00 - 2:15pm **312:** Th 8:00 - 9:15am **313:** We 1:00 - 2:15pm

Lecture 2 (Larget). **321:** Tu 1:00 - 2:15pm **322:** We 2:30 - 3:45pm **323:** We 1:00 - 2:15pm

Please answer the following questions.

1. The following questions concern sample size calculations for proportions.
 - (a) How large of a sample is needed for a 95% confidence interval to have a margin of error ≤ 0.01 .
 - (b) How large of a sample is needed for a 95% confidence interval to have a margin of error ≤ 0.001 .
 2. The following questions concern sample size calculations for the mean of a normal population. Recall that these problems require a guess for σ , the standard deviation of the population.
 - (a) Let $\sigma = 1$. How large of a sample is needed for a 90% confidence interval to have a margin of error ≤ 1.0 .
 - (b) Let $\sigma = 4$. How large of a sample is needed for a 95% confidence interval to have a margin of error ≤ 0.01 .
 - (c) Let $\sigma = 10$. How large of a sample is needed for a 99% confidence interval to have a margin of error ≤ 0.05 .
 3. The following questions concern power calculations for hypothesis tests regarding the mean of a normal population. Recall that these problems require a guess for σ , the standard deviation of the population. Here n denotes the sample size and α denotes the significance level of the test.
 - (a) Let $\sigma = 1, n = 25, \alpha = .05$. Find the rejection region for the test $H_0 : \mu = 5$ vs. $H_A : \mu \neq 5$. What is the power of the test at $\mu = 4.7$?
 - (b) Let $\sigma = 10, n = 50, \alpha = .05$. Find the rejection region for the test $H_0 : \mu = 100$ vs. $H_A : \mu > 100$. What is the power of the test at $\mu = 105$?
 - (c) Let $\sigma = 2, n = 100, \alpha = .01$. Find the rejection region for the test $H_0 : \mu = 7$ vs. $H_A : \mu < 7$. What is the power of the test at $\mu = 6.5$?
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