

**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  $\leq 0.01$ .
    - (b) How large of a sample is needed for a 95% confidence interval to have a margin of error  $\leq 0.001$ .
  2. The following questions concern sample size calculations for the mean of a normal population. Recall that these problems require a guess for  $\sigma$ , 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  $\leq 1.0$ .
    - (b) Let  $\sigma = 4$ . How large of a sample is needed for a 95% confidence interval to have a margin of error  $\leq 0.01$ .
    - (c) Let  $\sigma = 10$ . How large of a sample is needed for a 99% confidence interval to have a margin of error  $\leq 0.05$ .
  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  $\sigma$ , the standard deviation of the population. Here  $n$  denotes the sample size and  $\alpha$  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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