AP Statistics / Mr. Hansen   Name: _____
2/11/2015   For Mr. Hansen's use only: _____

Test on Introduction to Inferential Statistics
Time Limit: 40 minutes (60 minutes for extended time)

Instructions:

For short-answer questions, show answers in the blanks provided. **NO WORK IS EXPECTED.**

For free-response questions, you must show all steps.

Use correct notation throughout.

Shield your answers from view by other students. Points may be deducted if you fail to do so.

Keep your eyes on your own test papers. Your test may be collected and discarded (score of 0) if you fail to do so.

If you have a question, raise your hand. Points may be deducted if you speak during the test.

If you finish early, turn your entire packet over and wait quietly until time expires at 40 minutes.

Part I: Short Answer. Fill in each blank with the symbol, expression, word, or phrase that best fits.

1. If we reject H_0 when H_0 is actually true, we have committed a _____ error.
2. If we fail to reject H_0 when H_0 is actually false, we have committed a _____ error.
3. True or false: $\alpha = 1 - \beta$, where α is the significance level of the test and β is the probability of Type II error against any value of the alternative hypothesis. (Write "true" or "false.") _____
4. Specificity is defined as the probability of returning a _____ screening test result if the subject's true disease status is _____ . Therefore, an expression for the specificity of a test in terms of α and/or β would be _____ .
5. The four key areas of our course are exploratory _____ analysis, design of studies/experiments, probability, and _____ statistics.
6. An SRS of size 27 has a mean of 58 from a nearly normal population and a sample s.d. of 13. Compute a 90% confidence interval for the true population mean: _____
7. In an SRS of 200 voters, 38% support Mr. Hannsinn's bid to run for governor. Compute a 95% confidence interval for his true proportion of voter support. _____
8. Assume all assumptions for inference are met. If two SRS's of voters from different populations, 250 in each sample, have 38% and 44% support, respectively, for Mr. Hannsinn's bid to run for governor, what is the *P*-value of the appropriate test statistic? _____ Does this provide evidence at the $\alpha = 0.03$ level of a true difference between the proportions of support in the two populations? _____ (*Note:* If you can't fill in the first blank, make something up so that you can at least get credit for the second one.)
9. The test described in #8 is _____ -tailed.
10. The most common value for α is _____ .

Part II: Free Response. Show all necessary steps and work. Your conclusion must be in context of the problem.

11.   The femurs of zippy leopards have been measured from skeletal remains found in a fossil collection. The paleontologists in charge of the dig have determined that the collection is a fairly random representative sample of all zippy leopards from that part of the world's history.

A sample of 10 adult femur fossils shows lengths of 8.2, 9.6, 9.3, 8.9, 8.9, 9.1, 9.2, 9.3, 9.0, and 9.0 cm. Compute a 95% confidence interval for the true mean adult femur length for zippy leopards of that time period. You must check assumptions for full credit.

12(a). Last fall, Mr. Hannsinn's popularity among voters was 39%. It just was. That's not subject to debate.

This February, however, a new random poll of 350 voters in the state showed 40% popularity for Mr. Hannsinn. Is there evidence of an improvement in his popularity? Test at the $\alpha = 0.05$ level.

(b) Without showing any work, find a 95% confidence interval for Mr. Hannsinn's new popularity.

(c) Explain why the s.e. used in part (b) is different from that used in part (a). You can show the computation of both if you wish, but that is not required. There is plenty of room here to answer the question, but you may continue on the reverse side if you wish.