Department of Mathematics and Statistics
Semester 112

STAT319 Quiz 6 Monday May 14, 2012

Name: _____ ID #: _____

1) A research engineer for a tire manufacturer is investigating tire life for a new rubber compound. He built 10 tires and tested them, getting a mean of 51,492 kilometers and a standard deviation of 2035 kilometers.

   a) The engineer would like to demonstrate that the mean life of this new tire exceeds 50,000 kilometers. Formulate and test appropriate hypotheses at the 5% significance level, state all needed assumptions and draw a conclusion. *(7pts)*

   b) Bonus: *(2pts)*

      Find the p-value of the test in a).

2) A mechanical engineer performs a stress test on a new material in trying to establish that the mean number of cycles to failure exceeds 10 million cycles. A sample of size 50 castings is tested that had a mean of 10,115,000 cycles to failure and a standard deviation of 600,000 cycles.

a) What conclusion should he make at the 5% significance level? Perform a test that will answer his question. *(6pts)*

b) Find the rejection region for the test in a) in terms of $\bar{X}$, the sample mean. *(2pts)*

c) Bonus: *(3pts)* Find

$P\left(\bar{X} \text{ belongs to the rejection region in b) if the true mean } \mu = 10.3 \text{ million}\right)$

And explain it.