Department of Mathematics and Statistics
Semester 112

STAT319 Quiz 5 Wednesday May 2, 2012

Name: _____ ID #: _____

1) A 95% confidence interval for the mean thermal relaxation time of sand was found to be 20.0 ± 6.4 seconds.

   a) Give a practical interpretation of the interval above.

   b) Give a theoretical interpretation of the interval above.

2) Experiments are conducted to investigate the stability and permeability of asphalt concrete. Four specimens are prepared for asphalt content of 3%, and four specimens for asphalt of 7%. The following data is collected:

$$n_1 = 4, \quad \bar{X}_1 = 1007.25, \quad s_1 = 143.66$$
$$n_2 = 4, \quad \bar{X}_2 = 817.75, \quad s_2 = 73.63$$

   a) Find a 95% confidence interval for the difference between the mean permeabilities of concrete made with asphalt contents of 3% and 7%.

b) What assumptions did you make to find the interval above?

3) In a sample of 295 steel alloy failures that occurred in oil refineries and petrochemical plants in Japan, 118 were caused by stress corrosion cracking and corrosion fatigue.
   a) Construct a 99 % confidence interval for the true proportion of alloy failures caused by stress corrosion cracking.

   b) What is the error in estimating the true proportion in the confidence interval above?

   c) If you want to estimate the true proportion with half the size of the error found in b) above, with 99% confidence, what is the sample size required, using the estimate of the true proportion found above?