MATH 396 QUIZ III

Due Wednesday, 9 April.

1) Compare the sample mean's efficiency to the optimal efficiency obtained from Cramér-Rao for the Poisson distribution.

2) An additive is added to tires' rubber compound to improve life. Without the additive the mean life is $32,500$ miles. A sample size of 15 obtains an average of $33,800$ miles for the tire life. The standard deviation for both measurements is $\sigma = 4000$ miles. Test $H_0 : \mu = 32,500$ against a one-sided alternative at the $\alpha = 0.05$ level.

3) A sample of size 16 is drawn from a normal distribution having $\sigma = 6$ for testing $H_0 : \mu = 30$ against $H_1 : \mu \neq 30$. The sample gives a mean of 31. At an $\alpha = 0.05$ level, what do you conclude?

4) An arctic weather station has three electronic wind gauges. Only one is used at any given time. The lifetime of each gauge is exponentially distributed (PWT) with a mean of 1000 hours. What is the pdf of Y, the random variable giving the time at which the last windgauge wears out?

5) Is it believable that the numbers 65, 30, 55 are a random sample of size 3 from a normal distribution with $\mu = 50$ and $\sigma = 10$? *Hint:* Use χ^2 distribution and put $Z_i = (Y_i - 50)/10$ and use Theorem 7.3.2.