STA103
Spring 2002

**Print Name** _____

**Circle Section**: W 9:10, W 10:30, W 11:50, W 1:10

# Quiz 8

April 03, 2002

***PLEASE NOTE THAT POINTS WILL BE DEDUCTED FOR ILLEGIBLE NAMES***

**1.** (4 pts) Two different methods of manufacture, casting and die forging, were used to make parts for an appliance. In service tests of 100 of each type, 10 castings failed but only 3 forged parts were found to be defective. Find a 96% confidence interval for the difference between the proportions of the cast and forged parts that would fail under similar conditions.

**2.** Let $X_1, X_2, \ldots, X_n$ be a random sample from a Uniform $(\theta, \theta+1)$ distribution. Let $\bar{X}$ denote the sample mean. Consider the estimator $\hat{\theta} = \bar{X}$ for $\theta$. The variance of a Uniform $(a, b)$ distribution is $\frac{(a-b)^2}{12}$.

**(a)** (1 pt) Is $\hat{\theta}$ unbiased for $\theta$?

**(b)** (2 pts) Find the variance of $\hat{\theta}$.

**(c)** (3 pts) If you take many different samples of size $n$ from the above population and use $\hat{\theta}$ to estimate $\theta$, what will be the approximate average of the square of the difference between the parameter $\theta$ and the estimate?