Stat 345-002 Spring 2006 3/28/06 Name (Print!)_____KEY_____
Quiz 7

Show your work if you wish to receive credit.

1. The probability distribution of the time to complete an assembly operation is

$$f(x)=\begin{cases}0.1 & 30<x<40 \text{ seconds}\\ 0 & \text{o.w.}\end{cases}.$$

a. Determine the proportion of assemblies that requires more than 38 seconds to complete.

$$P(X>38)=\int_{38}^{40}0.1dx=0.1x\,|_{38}^{40}=0.2$$

b. What time is exceeded by 90% of assemblies?

$$P(X>x)=\int_{x}^{40}0.1dx=0.1x\,|_{x}^{40}=0.1(40-x)=0.9\Leftrightarrow x=31$$

c. Determine the mean and variance of time of assembly.

Continuous Uniform a=30 b=40 so $E(X)=\frac{30+40}{2}=35$ and $V(X)=\frac{(40-30)^2}{12}=\frac{100}{12}=8\frac{1}{3}$

2. Let Z be the standard normal random variable.

a. Find P(Z > 1.79) = .036727

b. Find z such that P(Z < z) = 0.75 z = 0.67

3. Let X be a normal random variable with μ = 100 and σ = 20.

a. Find P(X < 85)

$$P(X<85)=P(\frac{X-100}{20}<\frac{85-100}{20})=P(Z<-0.75)=0.226627$$

b. Find x such that P(X < x) = 0.75

$$P(X<x)=0.75\Leftrightarrow P\left(\frac{X-100}{20}<\frac{x-100}{20}\right)=0.75=P\left(Z<\frac{x-100}{20}\right)$$

$$\Leftrightarrow\frac{x-100}{20}=0.67\Leftrightarrow x=113.4$$