Hi class, we'll look at the following questions on Monday.

Excercise 1. We discussed the *sampling distribution* of the sample mean $\bar{x}$. For this we have the Central Limit Theorem, which states:

$$\mu_{\bar{x}} = \mu \quad \sigma_{\bar{x}} = SD(\bar{x}) = \sigma/\sqrt{n}$$

Finally, if n is large enough, then the distribution of $\bar{x}$ is approximately normal.

What do the following terms mean: *sampling distrition*, *approximately normal*?

What is the difference between σ and $\sigma_{\bar{x}}$?

Excercise 2. A tire manufacturer claims that the mean time their tire will last is 40,000 miles with a standard deviation of 5,000 miles.

A consumer group performs a survey finding that in 10 respondents, the average length the tire lasted was only 35,000 miles. Use the central limit theorem to find out if that is unusual. That is, find

$$P(\bar{x} \leq 35000)$$

Excercise 3. A cashier at a toll booth historically grossed on average 4000 dollars with a standard deviation of 300 dollars per day.

A new cashier averages 5,000 dollar for her first 5 days. Use the central limit theorem to determine if that is unusually large. That is find

$$P(\bar{x} \geq 5000).$$

Excercise 4. Kaz Matsui, a baseball player, historically gets an average of 28 hits in every 100 at bats. What is the probability in the upcoming season he averages 180 or more hits in 600 at bats? (What is binomial? Where do we use normal?)

Excercise 5. A sample of size 25 is drawn from a standard normal population (mean 0, standard deviation 1). Find a value a so that

$$P(-a \leq \bar{x} \leq a) = 0.95$$

(The answer is not 1.96, but this number gets used.)

Excercise 6. The central limit theorem says if n is large enough. What does this mean?