1. The distribution of $\bar{X}$:
   
   (a) $\mu_{\bar{X}} = \mu$.
   
   (b) $\sigma_{\bar{X}} = \frac{\sigma}{\sqrt{n}}$
   
   (c) If $n$ is large, the distribution of $\bar{X}$ is approximately normal. (Central Limit Theorem.)
   
   (d) If the $x_i$ have a normal distribution, then the distribution of $\bar{X}$ is exactly normal.

2. If the sample size is large then
   
   (a) The probability is approximately .95 that $\mu - 1.96 \frac{\sigma}{\sqrt{n}} < \bar{X} < \mu + 1.96 \frac{\sigma}{\sqrt{n}}$
   
   (b) The probability is approximately .95 that $\mu - 1.96 \frac{s}{\sqrt{n}} < \bar{X} < \mu + 1.96 \frac{s}{\sqrt{n}}$

3. An approximate 95% confidence interval for $\mu$:

   $$\bar{x} \pm 1.96 \frac{s}{\sqrt{n}}$$

4. Other confidence levels.

5. Removing the approximations in (2).

```r
> xbar=mean(Welds$ShearStr)
> s=sd(Welds$ShearStr)
> zcrit=qnorm(.975,0,1)
> c( xbar-zcrit*s/sqrt(100),xbar+zcrit*s/sqrt(100))
[1] 4980.277 5118.043
```

**Homework**

1. Read Devore and Farnum pages 294–299.

2. Do problems 7.2.12,14