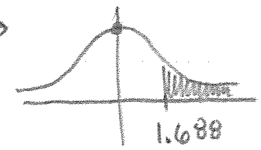
HW10 MATH 1550 Fall 2019

§7.3 **#17** Given data: $n=37$, $\bar{x}=5122$, $s=625$, $\alpha=0.05$

$n=37 \rightarrow$ d.f. $=36$

$H_0: \mu \leq 5000$

claim $\rightarrow$ $H_a: \mu > 5000 \rightarrow$ right tail



Test statistic

$$t = \frac{\bar{x} - \mu}{s/\sqrt{n}} = \frac{5122 - 5000}{625/\sqrt{37}} \approx 1.187$$

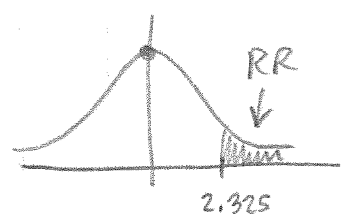
We fail to reject Ho, meaning there is evidence to support the claim.

§7.4 **#11** Given: $n=150$, $\hat{p}=0.77$, $\alpha=0.01$

claim $\rightarrow$ $H_0: p \leq 0.75$

$H_a: p > 0.75 \rightarrow$ right tailed

$1-\alpha = 0.99$



$q = 1-p = 1-0.75 = 0.25$

test statistic:

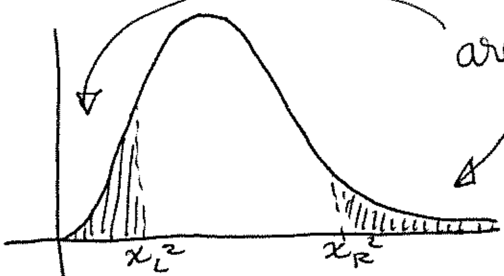
$$z = \frac{\hat{p} - \mu_{\hat{p}}}{\sqrt{pq/n}} = \frac{0.77 - 0.75}{\sqrt{\frac{(0.75)(0.25)}{150}}} \approx 0.565$$

We fail to reject Ho, meaning there is evidence to support the claim.

§7.5 #18

claim → $\begin{cases} H_0 : \sigma^2 \stackrel{?}{=} 1.0 \\ H_a : \sigma^2 \neq 1.0 \end{cases}$

$\begin{bmatrix} \alpha = 0.05 \\ n = 25 \\ s^2 = 1.65 \end{bmatrix} \rightarrow df = 24$



area = 0.05

area of each = 0.025

table → $\chi_L^2 = 12.401$

$\chi_R^2 = 39.364$

→ $\boxed{\text{Rejection Region: } \chi^2 < 12.401 \text{ or } \chi^2 > 39.364}$

Test - Statistic:

$\left[\chi^2 = \frac{(n-1)s^2}{\sigma^2} \right] \rightarrow \chi^2 = \frac{(25-1)(1.65)}{1.0} = \boxed{39.6}$

→ Reject H_0

→ "There is not sufficient evidence to support the claim."

§7.5 #19

$$\begin{cases} H_0 : \sigma \geq 36 \\ H_a : \sigma < 36 \end{cases}$$

claim → H_a

$$\left[\begin{array}{l} \alpha = 0.1 \\ n = 22 \\ s = 33.4 \end{array}\right] \rightarrow df = 21$$

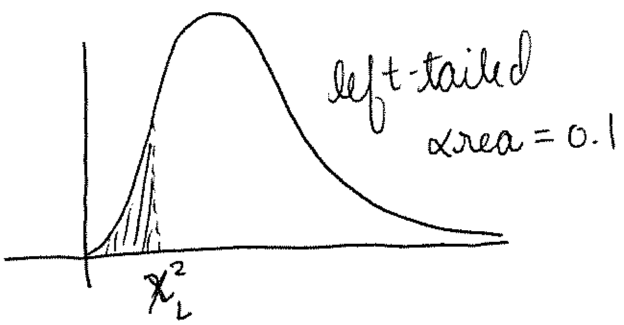


table → $\chi^2_L = 13.240$

→ $\boxed{\text{Rejection Region: } \chi^2 < 13.240}$

Test-Statistic

$$\left[\chi^2 = \frac{(n-1)s^2}{\sigma^2}\right] \rightarrow \chi^2 = \frac{(22-1)(33.4)^2}{36^2} = \boxed{18.0762}$$

→ Fail to reject H_0

→ "There is not sufficient evidence to support the claim."