Example 2: One wanted to see if the mean amount of time it takes one to pass through US Customs at the Calgary International Airport between 06:00 and 09:00 on a weekday morning is less than 60 minutes. Ten customers, whose flights left for US destinations, were randomly chosen in each of five weekdays. The amount of time it took each to clear US Customs after they had entered the airline queue for their respective flight was observed. From this sample of 50, the mean amount of time was observed to be 57.5 minutes the standard deviation was observed to be 10.2 minutes.

$\bar{x}$ s.

(a) Does this sample indicate that the mean amount of time it takes one to pass through US Customs at the Calgary International Airport (between 6AM and 9AM on a weekday) is less than 60 minutes? Test, setting the probability of making a Type I error to be 0.05.

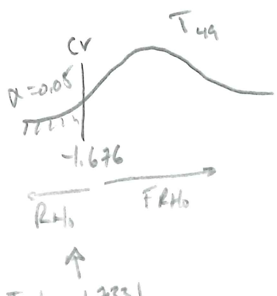
$H_0: \mu = 60$ $n = 50 = 10(5)$

$H_a: \mu < 60$ $\bar{x} = 57.5$ $S = 10.2$ σ unknown . . .

$$T_{calc} = \frac{\bar{x} - \mu_0}{S/\sqrt{n}} = \frac{57.5 - 60}{10.2/\sqrt{50}} \cong -1.7331$$

$$\text{P-value} = P[T_{49} < -1.7331] \cong pt[-1.7331, df = 49]$$

$$\cong 0.04468338$$



Since P-value < α RH_0 !

Based on this sample it appears that (@ 5% Significance level)

Average time to pass through US Customs @ Cal. International airport is sig. less than 60 minutes

(b) Interpret the meaning of the P -value found in (a).

if the true Average time it takes to pass through customs is 60 min the probability of collecting a Sample ($n=50$) that has a sample Average of less than 57.5 is 0.04468 $\Rightarrow$ 4.47%. which compared to 5% level where things are considered significant, is rare!

Since it would be rare to collect a sample with $\bar{x} \le 57.5$ and we did the evidence suggests $\mu < 60$