Stat 381 Apr 22

10.6 $H_0: p = .6$ $H_A: p \neq .6$ sample 15 get "X" if 6-12 don't reject H_0

$\alpha = P(\text{Reject} \mid p = .6) = P(X \leq 5 \text{ or } X \geq 13 \mid p = .6)$

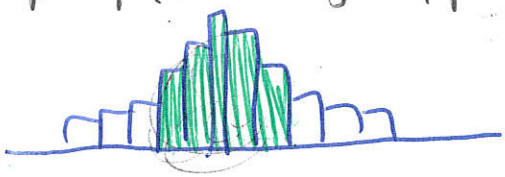
$= \text{binomcdf}(15, .6, 5) + (1 - \text{binomcdf}(15, .6, 12))$

$= .0609$

$= 1 - (\text{binomcdf}(15, .6, 12) - \text{binomcdf}(15, .6, 5))$

if $p = .5$

$\beta = P(\text{Don't reject} \mid p = .5) = P(6 \leq X \leq 12 \mid p = .5)$



$= \text{binomcdf}(15, .5, 12) - \text{binomcdf}(15, .5, 5)$

$= .845$ power $= .845 = .155$

if $p = .7$

$\beta = \text{binomcdf}(15, .7, 12) - \text{binomcdf}(15, .7, 5)$

$= .8695$

recall if n small or σ unknown use t-distribution.

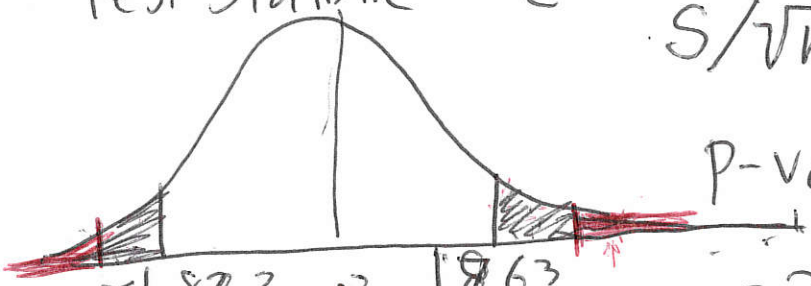
Consider sample of pH from water sources, want to check if the $pH_{\mu} \neq 7$

7.07, 7.00, 7.1, 6.97, 7, 7.03, 7.01, 7.01, 7.01, 6.98, 7.08 $n=11$

$H_0: \mu = 7$ $\bar{x} = 7.0236$

$H_A: \mu \neq 7$ $s = .04201$

Test Statistic $t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}} = \frac{7.0236 - 7}{.04201/\sqrt{11}} = 1.863$



$df = 10$

p-value $= 2 * P(T > |t|)$

$= 2 * tcdf(1.863, 100, 10)$
LB UB df

$= .092$

if p-val $< \alpha$ reject H_0

If $\alpha = .05$, since $.092 \not< .05$

Don't reject.

OR

Rejection Region.. t-dist with 10 df.

Rejection region:

Reject if $t > 2.228$ OR $t < -2.228$

Hypothesis teston

- difference between 2 pop means $\mu_1 - \mu_2$
- Pop proportion "p"
- diff of pop proportions "$p_1 - p_2$"
- pop variance.