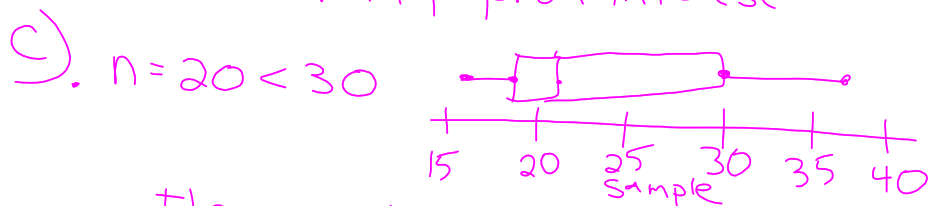


## Unit IV Review (Monday's hw)

1) a)  $df=19$   
 $24.8 \pm 2.093 \frac{7.5}{\sqrt{20}}$   
 $(21.29, 28.31)$

I am 95% confident the mean foot length of adults who used the cave is in this interval.

- b) •  $n \geq 30$  or population is normal  
 • SRS from pop. of interest



the sample is skewed right, may not be safe to assume pop. is normal.

- SRS of footprints?

random sample, but might not be of all adults who used the cave. (could be kids)

~~$H_0: \mu = 1.5$~~   
 $H_a: \mu > 1.5$

a) I reject  $H_0$  when  $H_0$  T. <sup>Evid shows avg.</sup> I think nic. is more than 1.5 but it isn't.

II fail to reject  $H_0$  when  $H_0$  F.  $\Rightarrow$  falsely accuse comp. of wrongdoing.   
 doesn't show nic. levels are higher, but they are

$\Rightarrow$  company gets away with it

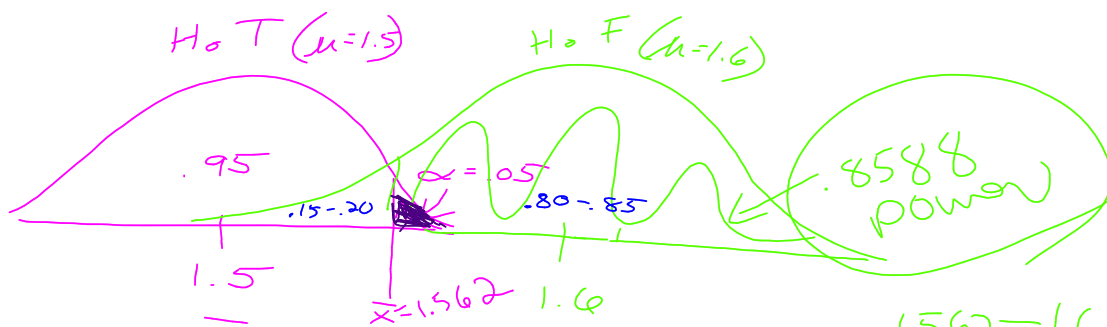
b)

	$H_0$	
	T	F
rej $H_0$	I $\alpha = .05$	power
	.95	II $\beta = 1 - \text{power}$
fail to rej $H_0$		



- c) increase power
- $\star$  increase  $\alpha$
  - $\star$  increase  $n$ 
    - smaller  $S_y$
    - greater distance between  $H_0$  and true value

as  $\frac{I}{\alpha}$  inc. /  $\frac{II}{\beta}$  decreases



$n=30$   
 $df=29$

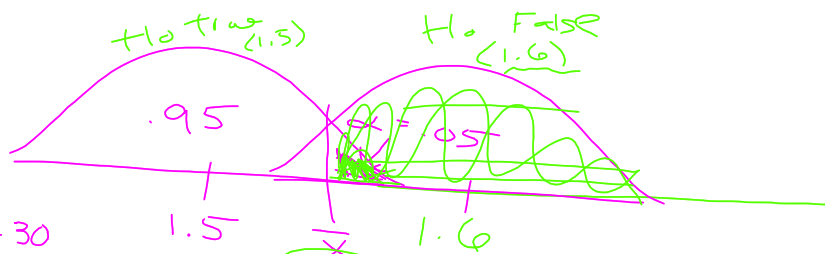
	.05	.8588
reject	.95	1-.8588

$t = 1.699$   
 $1.699 = \frac{\bar{x} - 1.5}{\frac{.2}{\sqrt{30}}}$   
 $\bar{x} = 1.562$

$t = \frac{1.562 - 1.6}{\frac{.2}{\sqrt{30}}}$

$t = -1.04$   $df=29$   
~~.8467~~  
~~.8588~~

$H_0: \mu = 1.5$   
 $H_a: \mu > 1.5$



$n=30$   
 $df=29$

$$t = 1.699 = \frac{\bar{x} - 1.5}{\frac{.2}{\sqrt{30}}}$$

$\bar{x} = 1.56$

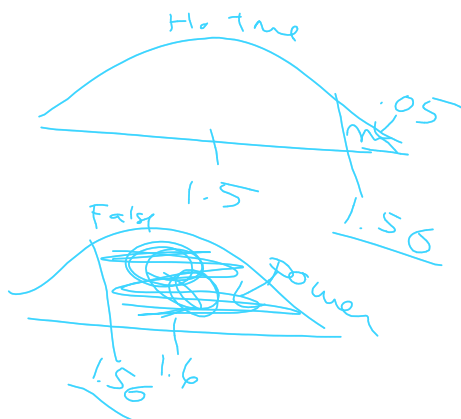
.05	.8588
.95	

$.10 - .15$

$$t = \frac{1.56 - 1.6}{\frac{.2}{\sqrt{30}}}$$

$t = -1.09$

.85 - .90



### mean or prop. w.s. #3

\*  $p = \text{prop. of } \underline{\text{1st time brides}}$   
younger than grames

$H_0: p = .5$

$H_a: p \neq .5$

$n = 100$   
 $\hat{p} = \frac{53}{100} = .53$   
 $\alpha = .01$



$$z = \frac{.53 - .50}{\sqrt{\frac{.5(1-.5)}{100}}} = .6$$

P-value =  $2 \cdot \Pr(z > .6) = 2(.2743) = .5486$

•  $np \geq 10$  and  $n(1-p) \geq 10$   
 $\frac{100(.5)}{50} \geq 10$  same

• SRS from pop. of interest

• problem says sampled 1st time brides. (assume SRS)

with a p-value of .5486, this sample is NOT sign. at the 1% level.

Fail to reject  $H_0$ .

There's no evid. the prop. of 1st time brides . . . . . differs from .5

### made up power problem

$p$  = proportion of <sup>driving</sup> PHS students that can't find parking

$H_0: p = .10$  not add parking

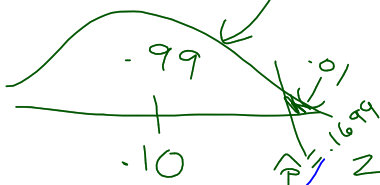
$H_a: p > .10$  add parking

Type I: Reject  $H_0$  <sup>evld. prop of</sup> is more than 10%, but it's ~~True~~ but it's actually not

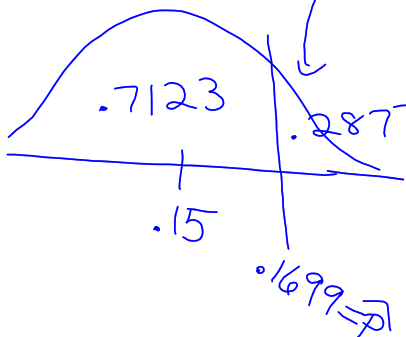
Type II: <sup>add parking → didn't need it</sup> fail to reject  $H_0$  but it's False  
data doesn't show more than 10% can't find parking, but is more than 10%

$n = 100$   
 $\alpha = .01$

	T	F
reject	I $\alpha = .01$ (.2877)	
fail to reject	.99	II .7123



$$z = 2.33 = \frac{\hat{p} - .10}{\sqrt{\frac{.10(1-.10)}{100}}}$$



$\hat{p} = .1699$

$$z = \frac{.1699 - .15}{\sqrt{\frac{.15(1-.15)}{100}}} = .56$$

\* Don't add parking but we really need it