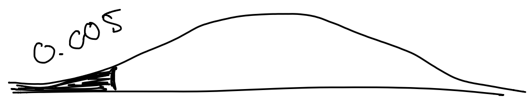
HW Review in class

99%

$z^* = 2.57 \rightarrow 2.58$



$n = \left(\frac{2 s z^*}{w} \right)^2$

$\boxed{128/129}$

$w = 1$ (μ)

$s = 2.2$ (σ)

one sided or 2 sided?

Before data gathered

college freshmen party 7.5 hours weekly (nat'l average)

($\mu \geq 7.5$) given

$H_0 : \mu = 7.5$

$H_a : \mu < 7.5$ want to prove

from last time ... :)

$z = \frac{\bar{x} - \mu_0}{\sigma / \sqrt{n}}$

$\bar{x} = 6.9$

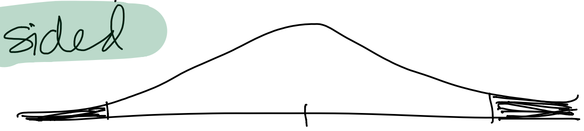
$s = 8$

$n = 100$

$z = \sim \boxed{-0.75}$ not extreme $(-1, 1)$

$-5, -3 \rightarrow$ extreme :)

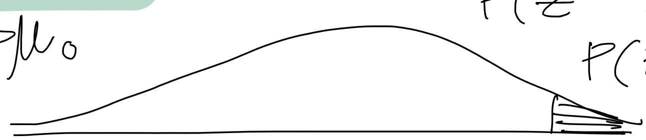
$H_a : \mu \neq \mu_0$ 2 sided



$P(|z^*| > |z|) = 2P(z^* < -|z|)$

one-sided

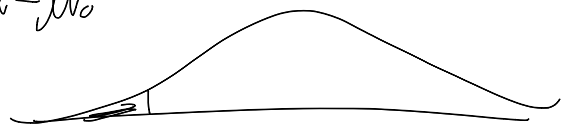
$H_a = \mu > \mu_0$



$P(z^* > z)$

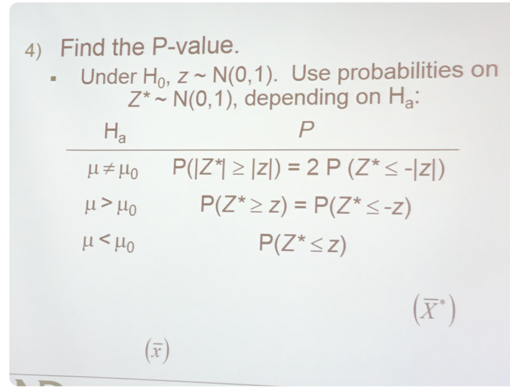
$P(z^* \leq -z)$

$H_a = \mu < \mu_0$



$P(z^* < z)$

Ta-Da!! ..



Pvalue gives cond. prob. that get sample mean less?

$P(z < -0.75)$

$= 0.2266$

$\sim 23\%$ → REJECT!

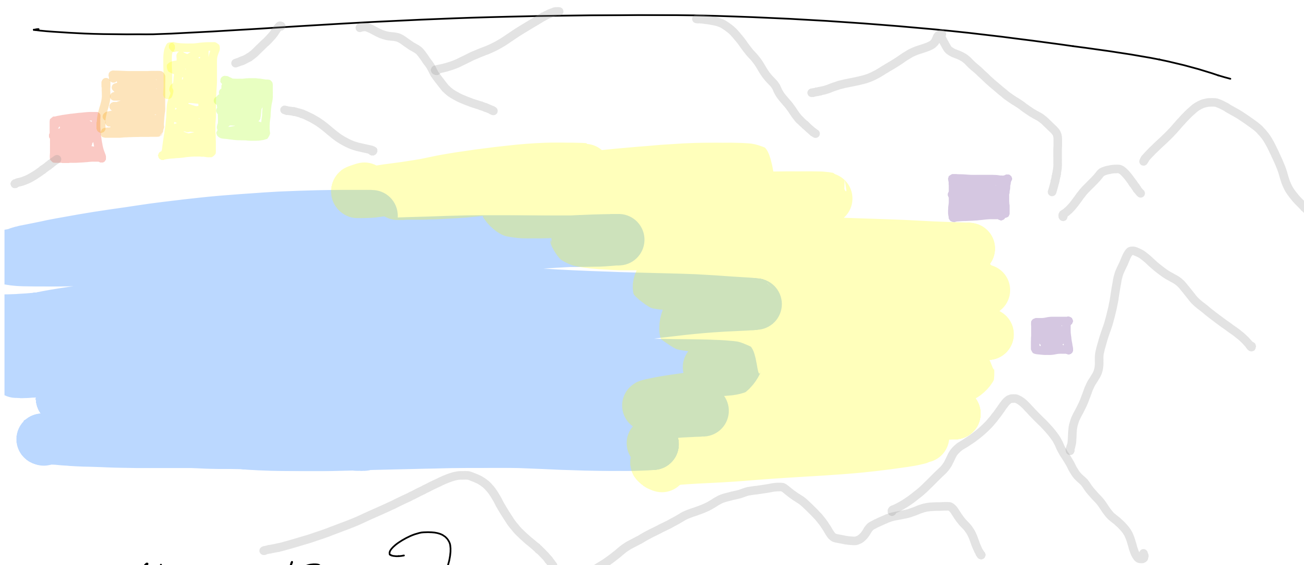
accept or reject?

if P value is big, accept

never accept null hyp (H_0)

always report P value :) yay!

(since $p = .23$, do not reject at significance level of $\alpha = 0.05$)



The Bay :)

If $P = 0.23$

$P(\mu = .75) = .23$ correct?

no

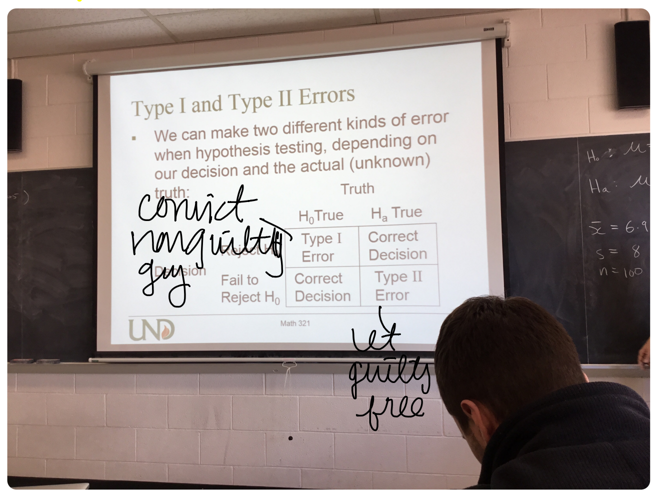
$P(H_0 \text{ is true}) = P$?

no

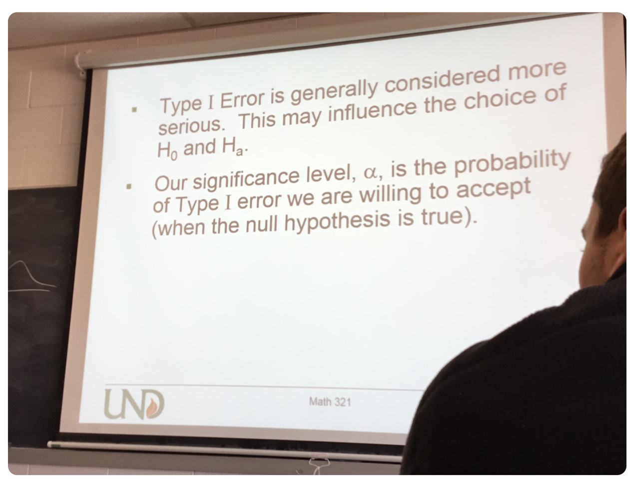
if $\mu = .75$, cond prob getting $.23$ = true

cond prob on random sample, not null hyp.

yeah



deciding alpha?
weigh ramifications of Type I error



reject when you should not have

<u>Shear strength</u> $H_0 = 100$
$H_a > 100$ ← want one sided → too big is okay, too small is important part (+ bad)

Type I Error: Bolt is strong enough when not
* make alpha small to avoid *

<u>air quality</u> $H_0 = \mu = 100$ too big is bad
one sided $H_a = \mu < 100$ too small is ok

<u>recalibrate milk</u> – too much / little are both bad
2 sided

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power of Hyp. Test
computed after sign. level determined + before test

P(reject H_0 | H_0 false)

Power = $1 - \beta$ → $1 - P(\text{Type 2 Error} \mid H_0 \text{ false})$

ex: $H_0 : \mu = 7.5$
$H_a : \mu < 7.4$

* only compute type II error w/ given value of μ

if significantly less, ex: 6.2
then consider change as significance

minitab → stats – 1 sample z-test
summarized data – fill out

(2 side test is default)
↓ change in options
mean < hyp. mean

* confirm CI

* still need to do by hand :)

difference = negative (reported μ)

want $\mu = 6.2$ $\therefore$ $6.2 - 7.5$

power is high – aka prob of error is ~ 49%

+ gets worse as sample size ↑

* Prob of type 1 (α alpha) easier to control vs type 2 (β beta) difficult to control *

Significance

50 mm

$n = 60$

$\bar{x} = 49.9865$

$s = 0.0524$

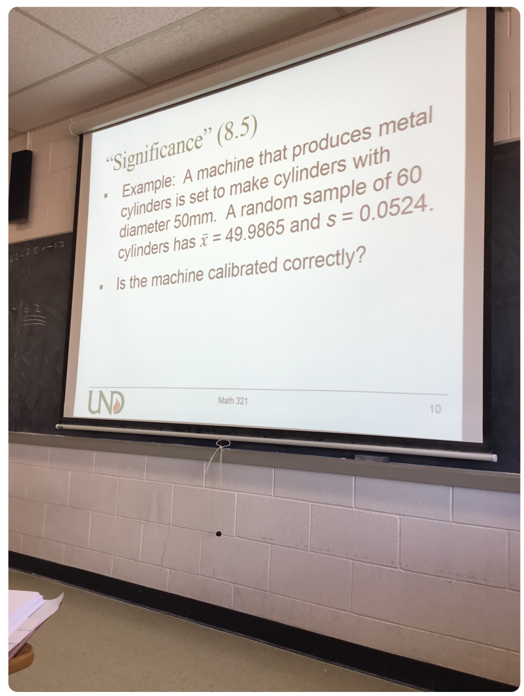
calibrated correctly? 2-sided test!!

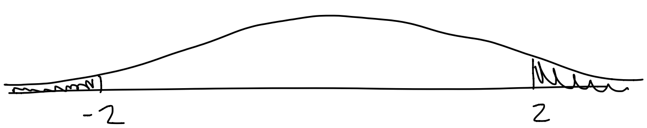
$H_0: \mu = 50$

$H_a: \mu \neq 50$

$$z = \frac{49.9865 - 50}{\frac{0.0524}{\sqrt{60}}} = -1.9956$$

round :: ≈ -2





$P(|z^*| > 2) = 2 * P(z^* < -2)$

$2 * (0.0228) = \boxed{0.0456}$

alpha of 5%

reject or not reject?

if P is small, REJECT

practical vs. statistical?

50mm vs. 49.990 .. not worth paying to fix

so - report conf. interval!!

95% CI

$$\bar{x} + 1.96\left(\frac{0.0524}{\sqrt{60}}\right) = 49.9998$$

$$\bar{x} - \ldots = 49.9731$$

95% conf. true mean is somewhere w/in interval

don't need to call guy?