A researcher wants to know if using their flashcard program increases the number of items an individual can memorize. The researcher knows that the population in general can memorize 50 items with a standard deviation of 10 items. Our researchers tested 25 individuals and found their average score to be 54.5. Use the $p<.05$ level of significance.

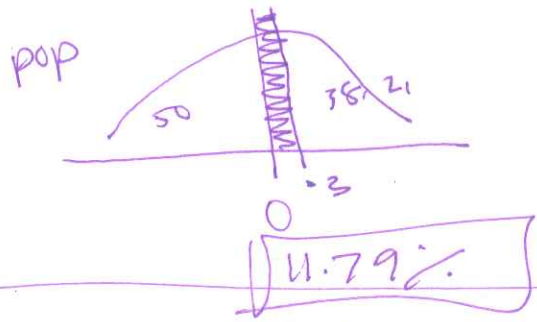
1) What is the population of interest?
2) Why would the researchers choose to assess a sample rather than the entire population?
3) Is random selection possible in this case? Explain why or why not.
4) What percentage of students would score between 50 and 53 on remembering items?
5) If we wanted to implement a learning assistance program for those students in the bottom 20%, what raw score of items would they need to score to be considered for the program?
6) List the six steps of hypothesis testing for this research experiment.
7) What is the confidence interval for the mean?
8) What is the effect size of this experiment?
9) What is the power of this experiment?

① people

② sampling is much faster, cheaper. don't have access to everyone, etc.

③ NO → don't have a way to get a list of everyone.

④



11.79%

$z = \frac{50-50}{10} = 0$

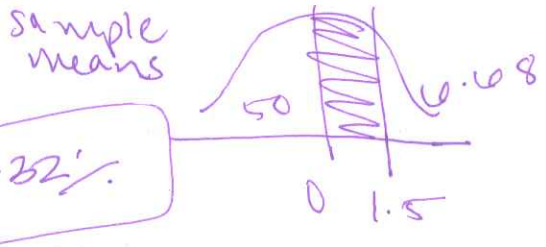
$z = \frac{53-50}{10}$

$\mu_M = 50$

$\sigma = 10$

$\sigma_M = \frac{10}{\sqrt{25}} = 2$

$M = 54.5$



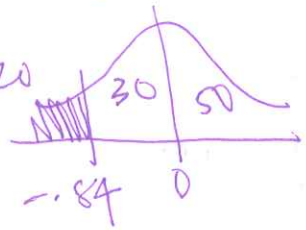
43.32%

$z = \frac{50-50}{2} = 0$

$z = \frac{53-50}{2} = 1.5$

* sorry this question is vague, usually I use top way w/o σ_M.

⑤



$X = -.84(10) + 50 = 41.6$

$z(\sigma) + \mu$

⑥ ① sample: Flashcard program; pop: general people

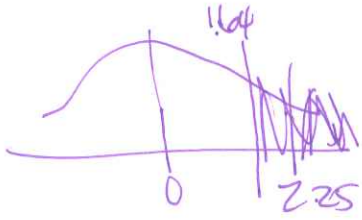
② R: > ; N: ≤

③ $M = 54.5$, $N = 25$; $\mu_m = 50$, $\sigma = 10$, $\sigma_m = 2$

z!

④ $p < .05$, > test = 1.64

⑤ $z = \frac{54.5 - 50}{2} = 2.25$

⑥ 

reject null

⑦ $54.5 + 1.96(2) = 58.42$
$54.5 - 1.96(2) = 50.58$

psst it's 1.96 cuz $p < .05$ but CIs are always 2 tailed

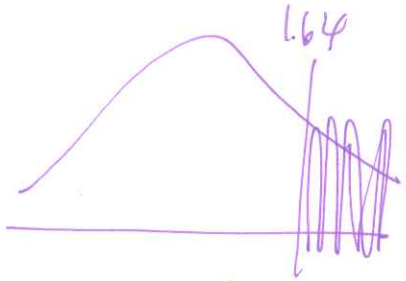
⑧ $d = \frac{54.5 - 50}{10} = .45$ (close to med)

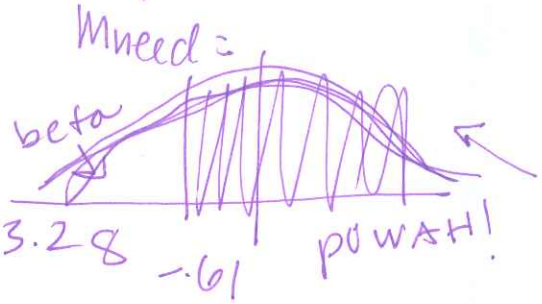
Assumpt.
DV = scale ✓ yes ratio
Dist = normal, maybe... $N > 30$ ✓
random select? no, but could do random assign.

⑨ POWER!

$\sigma = 10$
$\sigma_m = 2$
$N = 25$

$m = 54.5$
$\mu_m = 50$



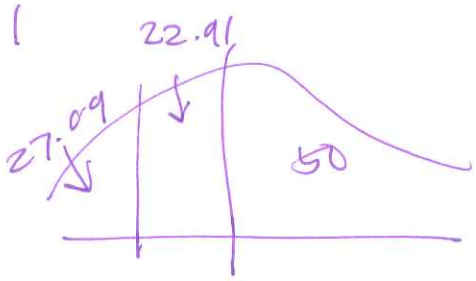


$M_{need} = 1.64(z) + 50 = 53.28$

-.61

How much do I got?

$= \frac{53.28 - 54.5}{2} = -.61$



power = 22.91 + 50

72.91

that is less than recommended 80%.

A researcher interested in treatments for depression believes that a newly found drug will be better at decreasing depression than the standard treatment. The researcher administers the drug to15 individuals over the course of a year and then has them take the Beck Depression Inventory to assess their level of depression. The mean of this inventory for the population in general is 18 with a standard deviation of 5.The individuals in the new treatment group had an average score of 12. If lower scores are related to lower ratings of depression, how much power did this study have at the .01 level?

want lower scores

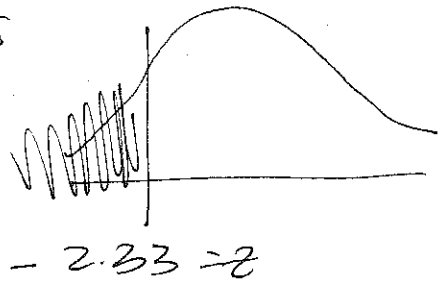
$\mu_M = 18$

$\sigma = 5$

$\sigma_M = \frac{5}{\sqrt{15}} = 1.29$

$N = 15$

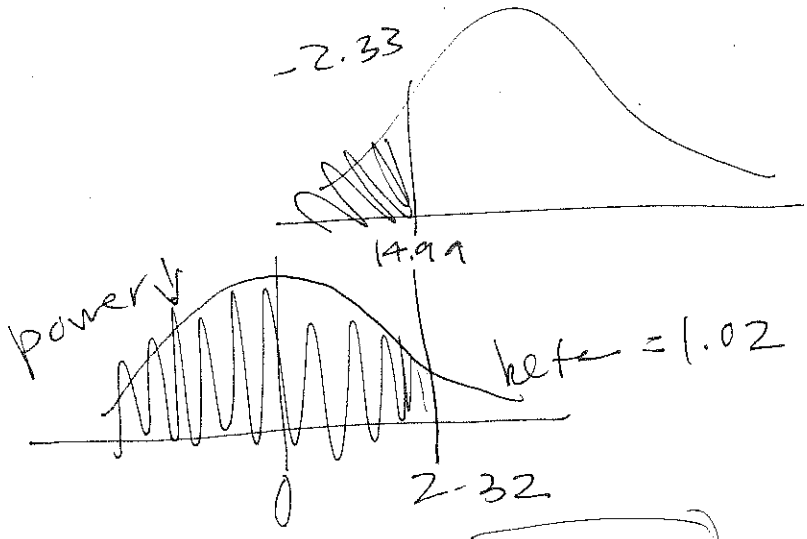
$M = 12$



$M_{need} = 2.33(1.29) + 18 = 14.99$

How much do I have?

$$\frac{14.99 - 12}{1.29} = 2.32$$



50 + 48.98 = 98.98

something + note big (extreme) Zs = more power from hyp tests

z = -4.65