13-16

a) $\hat{p} = .282$ (stat)

b) $p = .25$ CLT says the samp. dist. of $\hat{p}$ will be:

- approx. normal $.25(60{,}000) \geq 10$ $60000(1-.25) \geq 10$
- have a mean $(\mu_{\hat{p}})$ of .25
- and a st. dev $(\sigma_{\hat{p}})$ of .0018 $\leftarrow \sqrt{\frac{.25(1-.25)}{60000}}$

c)

$$z = \frac{.282 - .25}{.0018} = 17.78$$

d) YES! almost impossible to get a $\hat{p} = .282$ is $p = .25$

e) Same except:

$500(.25) \geq 10$ $500(1-.25) \geq 10$

$125 \geq 10$ $375 \geq 10$

$$z = \frac{.282 - .25}{.0194} = 1.65$$

$$\sigma_{\hat{p}} = \sqrt{\frac{.25(1-.25)}{500}} = .0194$$

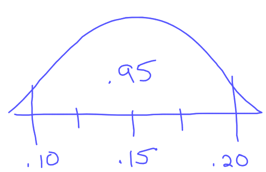
no, getting .282 is not overly surprising if $p = .25$ (less than 2 st. dev. away)

f) smaller sample size has less var., so .282 is 'farther away' statistically.

13-18

a) $\sqrt{\frac{.15(1-.15)}{n}} = \sigma_{\hat{p}}$

b)



95% w/in 2 st. dev.

$.15 + 2(\sigma_{\hat{p}}) = .20$

$2(\sigma_{\hat{p}}) = .05$

$\sigma_{\hat{p}} = .025$

$\sqrt{\frac{.15(1-.15)}{n}} = .025$

$\left(\sqrt{\frac{.1275}{n}}\right)^2 = (.025)^2$

$\frac{.1275}{n} = \frac{.000625}{1}$

$n = 204$

c) $\sqrt{\frac{.15(1-.15)}{n}} = .01$

⋮

$\boxed{n = 1275}$