13-14

a) $p = \frac{1}{3}$ parameter

b) CLT says the samp. dist. will be:

- approx. normal $\rightarrow$ $8000\left(\frac{1}{3}\right) \geq 10$ $\quad 8000\left(1-\frac{1}{3}\right) \geq 10$
- centered at $\frac{1}{3}\left(\mu_{\hat{p}} = \frac{1}{3}\right)$
- st. dev. of $\sigma_{\hat{p}} = \sqrt{\frac{\frac{1}{3}\left(1-\frac{1}{3}\right)}{80{,}000}} = .0017$

c) $.3333 \pm 2(.0017) = (.3299, .3367)$

d) huge n = tiny St. dev. = narrow interval

e) $\hat{p} = .316$ statistic

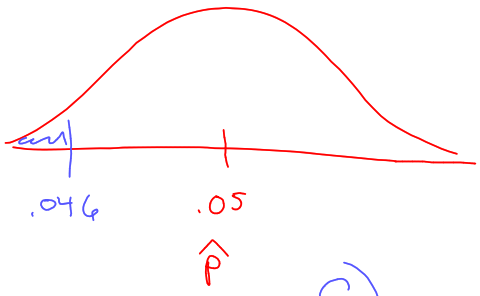
f) $z = \frac{.316 - .3333}{.0017} = -10.18$

g) YES! The $\hat{p} = .316$ is over 10 St. dev. from the mean. $P(z < -10.18) \approx 0$!

13-15

a) The CLT says the sampling dist. of the sample prop. ($\hat{p}$) of h.h. that own a pet bird will be:

- approx. normal (n is large enough) $\Rightarrow$ $n\hat{p} \geq 10$ and $n(1-\hat{p}) \geq 10$
  $80{,}000(.05) \geq 10$ and $80{,}000(1-.05) \geq 10$
  $4{,}000 \geq 10$ $76{,}000 \geq 10$
- have a mean of .05 ($\mu_{\hat{p}} = .05$)
- and a st. dev. of $\sqrt{\frac{.05(1-.05)}{80{,}000}} = .00077$ ($\sigma_{\hat{p}} = .00077$)



b) $\sigma_{\hat{p}}$ is smaller than in 13-14

$p = .05$ is closer to 0, less var.

c) $z = \frac{.046 - .05}{.00077} = -5.19$

$P(z < -5.19) \approx 0$

Yes, provides evid. it's not .05.

Very unlikely to get a $\hat{p}$ of .046 if actual p is .05.

Statistically significant