

Name: Solutions

Math 130

Date: 4/3/2025

Quiz 11

Some formulas you may need:

$$E = z_{\alpha/2} \sqrt{\frac{\hat{p}\hat{q}}{n}}$$

1. (1, 1, 1, 1, 4, 2 points) Apple wants to know what percent of cell phone users in Los Angeles own an Iphone. In order to figure this out, 319 cell phone users in Los Angeles were asked what kind of cell phone they own. Of the 319 people asked, 128 of them said that they own an Iphone.

a) What is the population?

All cell phone users in Los Angeles

b) What is the sample?

The 319 polled Los Angeles cell phone users.

c) What is the population parameter (symbol and in words)?

$p$  = The percentage of all Los Angeles cell phone users that own an Iphone

d) What is the best point estimate for the percentage of Los Angeles cell phone users who own an Iphone?

$$\hat{p} \approx \frac{128}{319} = 0.4013 = 40.13 \%$$

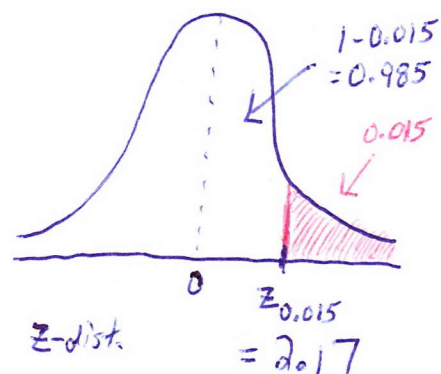
e) Construct a 97% confidence interval for the percentage of Los Angeles cell phone users who own an Iphone

$$Z_{\alpha/2} = ?$$

$$\begin{aligned}\alpha &= 1 - \text{conf. level} \\ &= 1 - 0.97 \\ &= 0.03\end{aligned}$$

$$\frac{\alpha}{2} = \frac{0.03}{2} = 0.015$$

$$Z_{\alpha/2} = Z_{0.015} = 2.17$$



$$E = ?$$

$$\begin{aligned}E &= Z_{\alpha/2} \sqrt{\frac{\hat{p}\hat{q}}{n}} = (2.17) \sqrt{\frac{(.4013)(.5987)}{319}} \\ &= 0.0596 = 5.96\%\end{aligned}$$

Interval

$$\hat{p} - E < p < \hat{p} + E$$

$$40.13\% - 5.96\% < p < 40.13\% + 5.96\%$$

$$34.17\% < p < 46.09\%$$

f) What does the 97% mean in a 97% confidence interval?

If you take many samples and use them to build many 97% confidence intervals, about 97% of the intervals will contain the correct answer for  $p$  and about 3% of the intervals will not contain the correct answer for  $p$ .