Name: Key

Standard Thirty: Quiz Eight – Significance Tests – Limitations

Below is a table with many parameters and statistics - fill in the blanks!

Letter	Statistic or Parameter	What does it represent?
n	----------	Sample Size
$\bar{x}$	Statistic	Sample mean
μ	Parameter	Population mean
μ_0	Parameter	Population mean testing value
ρ	Parameter	Population Proportion
$\hat{p}$	Statistic	Sample Proportion
ρ_0	Parameter	Population Proportion testing value
s	Statistic	Sample Standard Deviation
s^2	Statistic	Sample Variance
σ	Parameter	Population Standard Deviation
σ^2	Parameter	Population Variance

Standard Five: Quiz Eight – Measures of Center

Let's say Donald J Trump announced that he, astonishingly, has an above average number of arms and legs. Pretend that you are a fact-checker - explain why this particular statement by Mr. Trump would not be classified as false by really good, statistics-loving fact checkers.

There are more people with no or one arm than there are with three arms so the average will be $1.\overline{99}$ or so making his statement technically true. The median and mode, however are 2.

Name: _____

Standard Twenty-five: Quiz Eight – Confidence Intervals – for Proportions

http://www.clearfood.com/food_reports/2015/the_hotdog_report

$n = 345$

Clear Food sampled 345 hot dogs from 75 brands and 10 retail locations. Of the sampled hot dogs three contained human DNA. Find a 99% confidence interval for the population proportion of hot dogs that contain human DNA.

$\hat{p} = 3/345 = .0087$

a. Find a 99% confidence interval for the population proportion of hot dogs that contain human DNA.

$$\hat{p} \pm z_{1-\alpha/2}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

$$.0087 \pm 2.58\sqrt{\frac{.0087(1-.0087)}{345}}$$

$$(-.0042, .0216)$$

b. Are our assumptions for confidence intervals for the population proportion met?

~~Random Sample~~ (Needs to be assumed)

~~$n\hat{p} = 345(.0087) = 3 < 15$~~

$n(1-\hat{p}) = 345(1-.0087) = 342 > 15$

Not all of our assumptions are met.

c. Interpret the confidence interval found in part a.

We are 99% confident that the true population proportion of hot dogs w/ human DNA is between -.0042 and .0216 — 0% and 2.16%. We are concerned about this result because our assumptions weren't met.

Name: _____

Standard Twenty-seven: Quiz Eight – Confidence Intervals – for Means

http://www.gallup.com/poll/156770/majority-drink-alcohol-averaging-four-drinks-week.aspx

$n=646$ $\bar{x}=4.1$

According to a Gallup poll of 646 American drinkers averaged 4.1 drinks per week. Assuming a standard deviation of 8 drinks, make inference on the population mean number of drinks per week for all American drinkers. $\sigma_x = 8$

a. Find a 95% confidence interval for the population mean number of drinks per week for all American drinkers.

$$\bar{X} \pm Z_{1-\alpha/2} \frac{\sigma_x}{\sqrt{n}}$$

$$4.1 \pm 1.96 \left(\frac{8}{\sqrt{646}}\right)$$

$$(3.4831, 4.7169)$$

b. Are our assumptions met?

~~a~~ Random Sample (This needs to be assumed)

☑ $n \geq 30$ ✓ or the population is normal. ✗

c. Interpret the confidence interval found in part a.

We are 95% confident that the true population mean number of drinks per week for all American drinkers is between 3.4831 and 4.7169.