Quiz 12 Review

Name: Key

Confidence Intervals of Proportions

Date: _____ Period: _____

Vocabulary

1. The symbol used to denote a population proportion is p.
2. The symbol $\hat{p}$ is used to denote a sample proportion.
3. $\hat{q}$ can be found using the equation $\hat{q} = 1 - \hat{p}$.
4. The formula used to find the confidence interval of a proportion is $\hat{p} - Z_{\frac{\alpha}{2}}\sqrt{\frac{(\hat{p}\hat{q})}{n}} < p < \hat{p} + Z_{\frac{\alpha}{2}}\sqrt{\frac{(\hat{p}\hat{q})}{n}}$.
5. $\hat{p}$ can be found using the equation $\hat{p} = x/n$.

Work Problems

67-68 Confidence Intervals for Proportions. (ROUND TO THREE DECIMAL PLACES!)

Formula: $\hat{p} - Z\alpha/_2\sqrt{\left(\frac{(\hat{p}\cdot\hat{q})}{n}\right)} < p < \hat{p} + Z\alpha/_2\sqrt{\left(\frac{(\hat{p}\cdot\hat{q})}{n}\right)}$

5. A political analyst found that 60% of 300 Republican voters believe that the federal government has too much power. Find the 95% confidence interval of the population proportion of Republican voters who feel this way.

$Z_{\frac{\alpha}{2}} = \pm 1.96$
$n = 300$
$\hat{p} = .6$
$\hat{q} = .4$

$.6 - 1.96\sqrt{\frac{(.6\cdot.4)}{300}} < p < .6 + 1.96\sqrt{\frac{(.6\cdot.4)}{300}}$

$.545 < p < .655$

6. A recent study of 75 workers found that 53 people rode the bus to work each day. Find the 98% confidence interval of the proportion of all workers who rode the bus to work.

$Z_{\frac{\alpha}{2}} = \pm 2.33$
$n = 75$
$\hat{p} = 53/75 = .707$
$\hat{q} = 1 - .707 = .293$

$.707 - 2.33\sqrt{\frac{(.707\cdot.293)}{75}} < p < .707 - 2.33\sqrt{\frac{(.707\cdot.293)}{75}}$

$.585 < p < .829$

7. A nutritionist wishes to determine the true proportion of adults who do not eat any lunch. He wishes his estimate to be 90% confident that it contains the population proportion. A previous study found that 15% of the 125 people surveyed said that did not eat lunch.

$Z_{\frac{\alpha}{2}} = \pm 1.65$
$n = 125$
$\hat{p} = .15$
$\hat{q} = .85$

$.15 - 1.65\sqrt{\frac{(.15\cdot.85)}{125}} < p < .15 + 1.65\sqrt{\frac{(.15\cdot.85)}{125}}$

$.097 < p < .203$

8. A researcher wants to be 99% confident in an estimate of the true proportion of women who are over 55 who are widows. A recent study indicated that 29 of the 100 women over 55 in the study were widows.

$Z_{\frac{\alpha}{2}} = \pm 2.58$
$n = 100$
$\hat{p} = \frac{29}{100} = .29$
$\hat{q} = 1 - .29 = .71$

$.29 - 2.58\sqrt{\frac{(.29\cdot.71)}{100}} < p < .29 + 2.58\sqrt{\frac{(.29\cdot.71)}{100}}$

$.173 < p < .407$