Section 8-5 Hypothesis Testing – Proportions

Tests for Proportions:

Use $z$ scores for the critical values and $z = \frac{\hat{p} - p}{\sqrt{pq/n}}$ for the test value, where

$\hat{p} = \frac{X}{n}$, $p =$ population proportion, $n =$ sample size

OR

Use $z$ scores for the critical values and $z = \frac{x - np}{\sqrt{npq}}$ for the test value, where

$x =$ number with desired trait in sample, $n =$ sample size, $p =$ population proportion, $q =$ $p - 1$

A salesperson claims that 40% of the people who come into the store make a purchase. To test this claim, the store manager selected a sample of 100 people in the store and found that 37 made a purchase. At the 0.01 level, is the salesperson’s claim correct?

**GIVEN:** The claim is that the true proportion is 40% $\Rightarrow \rho = .4$

**FROM THE SAMPLE:** $n = 100$

$x = 37$

**HYPOTHESIS TEST:***

1. $H_0: \rho = .4$

   $H_1: \rho \neq .4$

   **CLAIM**

2. critical value, 2-tail, $\alpha = .01$

   **FROM ST. NORMAL DISTRIBUTION**

3. $z = \frac{\hat{p} - p}{\sqrt{pq/n}}$

   $= \frac{37 - .4}{\sqrt{(100)(.4)(.6)}} = -1.61$

   **OR**

   $z = \frac{x - np}{\sqrt{npq}}$

   $= \frac{37 - (100)(.4)}{\sqrt{100(.4)(.6)}}$

   $= -1.61$

4. DNR: $H_0: \rho = .4$

5. There is not enough evidence to reject the claim that $\rho = .4$