0.1 Part 2: One Sample proportion test

$$H_0 : \pi = 60\%$$

$$H_1 : \pi \neq 60\%$$

CI for Proportion: Example (1)

- $\hat{p} = 0.62$
- Sample Size $n = 250$
- Confidence level $1 - \alpha$ is 95%

CI for Proportion: Example (2)

- First, lets determine the quantile.
- The sample size is large, so we will use the Z distribution.
- (Alternatively we can uses the $t-$ distribution with ∞ degrees of freedom.

Computing the Standard Error

$$S.E.(\hat{p}) \ = \ \sqrt{\frac{\hat{(p)} \times (100 - \hat{p})}{n}}$$

$$\hat{p} = 144/200 \times 100\% = 0.72 \times 100\%. = 72$$

$100\% - \hat{p} = 100\% - 72\% = 28\%$

Computing the Standard Error

$$S.E.(\hat{p}) \ = \ \sqrt{\frac{72 \times 28}{200}}$$

Standard Error for Proportions

The standard error for proportions is computed using this formula.

$$S.E.(\hat{p}) \;=\; \sqrt{\frac{\hat{p} \times (1-\hat{p})}{n}}$$

When expressing the proportion as a percentage, we adjust the standard error accordingly.

$$S.E.(\hat{p}) \;=\; \sqrt{\frac{\hat{p} \times (100-\hat{p})}{n}}$$

Sample Proportion : Example

Point Estimate The sample proportion is computed as follows

$$\hat{p} = \frac{x}{n} = \frac{56}{160} = 0.35$$

Quantile We are asked for a 95% confidence interval. The quantile is therefore

$$z_{\alpha/2} = 1.96$$

Standard Error The standard error, with sample size n=120 is computed as follows

$$\text{S.E.}(\hat{p}) = \sqrt{\frac{\hat{p} \times (1-\hat{p})}{n}} = \sqrt{\frac{0.35 \times 0.65}{160}}$$

(Full solution to follow)