

LAB SESSION 5 – CI'S & HYPOTHESES

Analytics Primer

CONFIDENCE INTERVAL CRITICAL VALUES

Example

- What is the critical value from the standard normal used for the following Confidence Intervals?

- 99%

2.57 or 2.58 (actually ~ 2.576)

- 94%

1.88 (actually ~ 1.881)

- 85%

1.44 (actually ~ 1.439)

WARRANTY ON TELEVISIONS

Example

- An electronics manufacturer provides a full warranty on a certain type of television they make. The company will replace the television if any problems occur in the first year of use. The manager in charge of the warranty division wants to determine the proportion of warranties that are claimed. The manager samples 150 customer records and found that 17 of the customers used their warranty. Create a 95% confidence interval for the estimate of the proportion of customers who use their warranties.

$$0.113 \pm 1.96 \sqrt{\frac{0.113(1 - 0.113)}{150}} \rightarrow (0.062, 0.164)$$

T-DISTRIBUTION QUANTILES

Example

- Determine the quantile from the t-distribution for each of the following:

- $n = 45$, 99%

T-table $\rightarrow 2.704$, R $\rightarrow 2.692$

- $n = 21$, 90%

T-table $\rightarrow 1.725$, R $\rightarrow 1.725$

- $n = 15$, 95%

T-table $\rightarrow 2.145$, R $\rightarrow 2.145$

RETAIL STORE SALES

Example

- Build a 90% confidence interval for the true average daily sales in thousands of dollars for stores. A sample of 101 stores was taken with a sample mean of \$17.06K/day with a sample standard deviation of \$5.12K.

$$17.06 \pm 1.66 \times \frac{5.12}{\sqrt{101}} \rightarrow (16.21, 17.91)$$

PRINTER MANUFACTURER

Example

- An analyst for a printer manufacturer wants to estimate the mean number of pages printed before the ink runs out for a specific type of printer. The analyst wants a 95% confidence interval with a margin of error of 5 pages. A pilot study was conducted to show the sample standard deviation of printed pages before running out of ink was 15. What size sample does this analyst need to take?

$$n = \frac{(1.96^2 \times 15^2)}{5^2} = 34.57 \sim 35$$