

### StatCrunch Lab 9 for Statistics 301

**Topics:** confidence intervals of  $p$ ,  $\mu$  and  $\sigma^2$ ,  $t$ -distribution probability and percentiles, chi-square probability and percentiles

#### Confidence Intervals For Proportion $p$ .

It is found 54 of 180 (or  $\hat{p} = \frac{54}{180} = 0.3$ ) randomly selected from 100,000 credit card purchase slips are made with Visa. The 95% CI for proportion of all credit cards made with Visa,  $p$ , is (0.233, 0.367).

Stat, Proportions, one sample, with summary, Number of successes: 54, Number of observations: 180, choose Confidence Interval 0.95, Calculate.

#### Confidence Interval For Mean $\mu$ .

Average weight of simple random sample of 11 PNC students is  $\bar{x} = 167$  pounds with sample SD  $s = 20.1$  pounds. Weights normally distributed, no outliers. The 95% CI for  $\mu$  is (153.5, 180.5).

Stat, T statistics, One sample, with summary, Sample mean: 167 Sample std. dev.: 20.1 sample size: 11, Next, choose Confidence Interval 0.95, Calculate.

#### Confidence Interval For Mean $\mu$ with data.

Corn cob lengths for  $n = 15 < 30$  cobs, chosen at random, are noted.

18, 23, 24, 20, 21, 19, 27, 24, 19, 20, 25, 20, 18, 26, 20

The 95% CI for  $\mu$  is (19.95, 23.25).

Blank data table. Relabel var1 as length. Type 15 lengths into length column. Data, Save data, 9.2 corn cob lengths, then Stat, T statistics, One sample, with data, Next, choose Confidence Interval 0.95, Calculate.

#### Confidence Interval For Variance $\sigma^2$ .

In a simple random sample of 28 cars, variance in gap between door and jamb is  $s^2 = 0.7$  mm<sup>2</sup>. Calculate 95% CI. Assume normality with no outliers. The 95% CI for  $\sigma^2$  is (0.44, 1.30).

Stat, Variance, One sample, with summary, Sample variance: 0.7 Sample size: 28, Next, choose Confidence Interval 0.95, Calculate.)

**Probability and Percentile For  $t$ -distribution.**

Assume temperature,  $T$ , follows a  $t$  distribution with 4 degrees of freedom.

- Probability temperature is less than  $1.42^\circ$ , is  
 $P(t < 1.42) = 0.886$

Stat, Calculators, T (Not Normal!), DF: 4, Prob( $X \leq 1.42$ ) =  Compute.

- The 92nd percentile is  $1.72^\circ$ .

Stat, Calculators, T, DF: 4, Prob( $X \leq$  ) = 0.92 Compute.

**Probability and Percentile For Chi-Square Distribution.**

At McDonalds in Westville, waiting time to order (in minutes),  $X$ , follows a *chi-square*,  $\chi^2$ , distribution.

- For a  $\chi^2$  with 4 df, probability of waiting less than 3.9 minutes  
 $P(\chi^2 < 3.9) = 0.58$

Stat, Calculators, Chi-square, DF: 4, Prob( $X \leq 3.9$ ) =  Compute.

- The 72nd percentile waiting time for a  $\chi^2$  with 4 df, is 5.1 minutes.

Stat, Calculators, Chi-square, DF: 4, Prob( $X \leq$  ) = 0.72 Compute.