0.1 Confidence Intervals

- A sample of 300 households in a large town revealed that 183 have home computers.
- Construct a 95% confidence interval for the proportion of households with home computers in the whole town.

Sample size:

- n =300 : (N.B. Large sample)

Estimate: Sample proportion
(N.B. Percentages are easier to work with.)
t-value:

- 95% confidence , therefore = 0.05
- two tailed procedure, therefore k = 2
- therefore column to use = 0.025

Large sample: degrees of freedom = i.e. bottom row
therefore t-value is 1.96
Standard Error: from Formulae

$$\frac{p(1-p)}{n} = \frac{61 \times 39}{300} = 2.81\%$$

Confidence Interval :

$$\text{estimate} \pm (\text{t-value} \times \text{std. error})$$

$$61\% \pm (1.96 \times 2.81\%)$$

0.1.1 Example 2

- The average height of 100 Irish students was 1.72m and the variance 0.0144m2.
- Calculate 95% and 99% confidence intervals for the average height of the population of Irish students.

Variance : 0.0144m2. Standard deviation is therefore 0.12m estimate : sample mean 1.72m sample size : 100 (large sample)

- 95% confidence , therefore = 0.05
- two tailed procedure, therefore k = 2
- therefore column to use = 0.025

Large sample degrees of freedom = i.e. bottom row

therefore t-value is 1.96 99% confidence , therefore = 0.01 two tailed procedure, therefore k = 2 therefore column to use = 0.005

Large sample degrees of freedom = i.e. bottom row

therefore t-value is 2.576

Standard Error (from Formulae) sn =0.12100 =0.012m 95% Confidence Interval : estimate(t-valuestd. error)

$$1.72 \pm (1.96 \times 0.012) =$$

99% Confidence Interval : estimate(t-valuestd. error)

$$1.72(2.576 \times 0.012) =$$