**Topics in Confidence Intervals:**

Assumptions:

* random sample from a normal distribution with mean µ, or
* random sample from a distribution with mean µ, finite variance. Sample size must be large in this case. χ

**CI for the mean:**

|  |  |
| --- | --- |
| Based on the Statistic: | CI formula |
|  |  |

**CI for the variance:**

|  |  |
| --- | --- |
| Based on the Statistic: | CI formula |
|  |  |

**CI for the ratio of 2 variances:** X1,…,Xm random sample from normal with variance σX2, and Y1,…,Yn random sample from normal with variance σY2. Both samples are independent of each other.

|  |  |
| --- | --- |
| Based on the Statistic: | CI formula |
|  |  |

**CI for proportion:** = sample proportion.

|  |  |
| --- | --- |
| Based on the Statistic: | CI formula |
|  |  |
| Assumptions: and |  |

**CI for proportion when n is not that large:** where and are the solution to the following. Let =number of success in the sample (of size N).

Upper limit: Solve

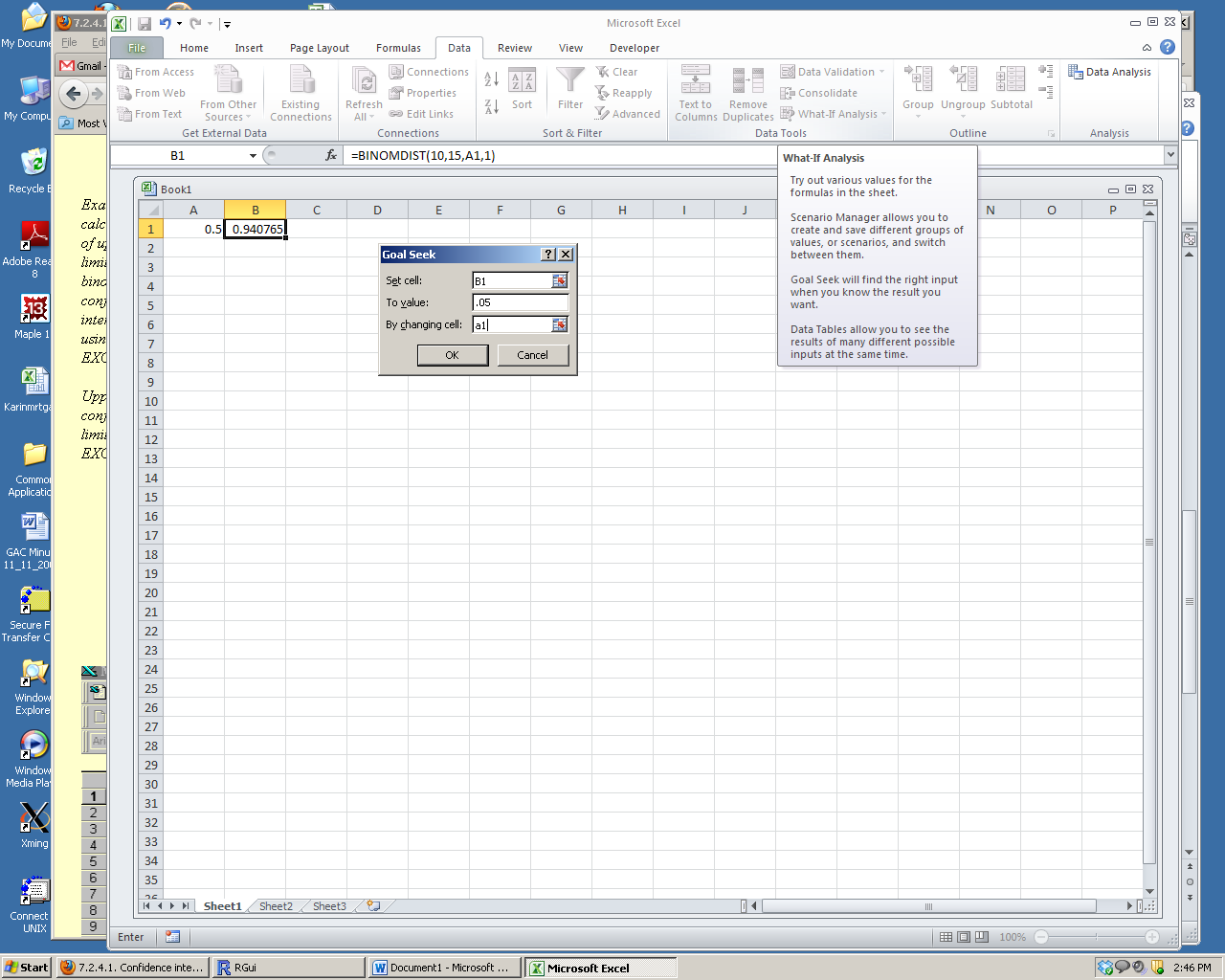
Lower limit: solve

The interval (*pL*, *pU*) is an exact 100(1 - alpha)% confidence interval for *p*. However, it is not symmetric about the observed proportion defective, .

To solve for *pU*:

1. Open an EXCEL spreadsheet and put the starting value of 0.5 in the A1 cell.
2. Put =BINOMDIST(*Ns*, *N*, *A1*, *1*) in B1, where *Ns* = 10 and *N* = 15.
3. Select the Data menu and click on What-if-analysis. Select: GOAL SEEK. The GOAL SEEK box requires 3 entries./li>
   * B1 in the "Set Cell" box
   * alpha/2 = 0.05 in the "To Value" box
   * A1 in the "By Changing Cell" box.

The picture below shows the steps in the procedure.



There is a wonderful statistical software called R, that is free and does a lot of things for you. (The R project for statistical computing: http://www.r-project.org/)

The command in R: prop.test(15,20) gives you, among other things, a 95% CI for the proportion.