Goodness-of-Fit Tests

R Handout

Derek H. Ogle

## First Commands

> library(NCStats)

## Goodness-of-Fit Test

[Four-o'clocks (*Mirabilis jalapa*)](https://en.wikipedia.org/wiki/Mirabilis_jalapa) are plants native to tropical America. Individual four-o'clocks can have red, white, or pink flowers. Flower color in this species is thought to be controlled by a single gene locus with two alleles experssing incomplete dominance, so that heterozygotes are pink-flowered, while homozygotes for one allele are white-flowered and homozygotes for the other allele are red-flowered [(see this)](https://en.wikipedia.org/wiki/Mirabilis_jalapa#Genetic_studies). According to [Mendelian genetic principles](https://en.wikipedia.org/wiki/Mendelian_inheritance), self-pollination of pink-flowered plants should produce progeny that have red, pink, and white flowers in a 1:2:1 ratio. A horticulturist allowed several pink-flowered plants to self-pollinate and produce 240 progeny with 55 that were red-flowered, 132 that were pink-flowered, and 53 that were white-flowered. Use the results to determine, at the 5% level, if the theoretical 1:2:1 ratio is upheld with these data.

> obs <- c(red=55,pink=132,white=53)  
> exp.p <- c(red=1/4,pink=2/4,white=1/4)  
> chi1 <- chisq.test(obs,p=exp.p,rescale=TRUE,correct=FALSE)  
> chi1$expected

red pink white   
 60 120 60

> chi1$observed

red pink white   
 55 132 53

> chi1

Chi-squared test for given probabilities with obs   
X-squared = 2.4333, df = 2, p-value = 0.2962

> gofCI(chi1,digits=3)

p.obs p.LCI p.UCI p.exp  
red 0.229 0.181 0.286 0.25  
pink 0.550 0.487 0.612 0.50  
white 0.221 0.173 0.277 0.25