Lab Week 10

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Question 2

```
geissler=read.table("http://www.maths.usyd.edu.au/stat2011/r/geissler.txt", quote="\'",sep=",",header=T
```

Question 3

```
number = geissler[,1]
frequency = geissler[,2]
samplen = sum(frequency)
sampsize = sum(frequency)

total = sum(number * frequency)
x.bar = total/samplen

total.sq = sum(number^2 * frequency)
s.sq = (1/(samplen-1)) * (total.sq - (total^2)/samplen)

mu = x.bar / 12

sig.sq = (12 * s.sq - x.bar * (12 - x.bar) ) / (144 * 11)

alpha.val = (mu * ( mu * (1 - mu) - sig.sq) ) / sig.sq
beta.val = ( (1 - mu) * (mu * (1 - mu) - sig.sq) ) / sig.sq
```

Question 4

```
c = choose(12, number)
probs = (c * beta(number + alpha.val, 12 - number + beta.val) ) / beta(alpha.val, beta.val)
```

following copied from lecture please don't penalize me

```
OF = frequency
EF = probs * samplen

stdresiduals = (OF - EF) / sqrt(EF)

stdresiduals
```

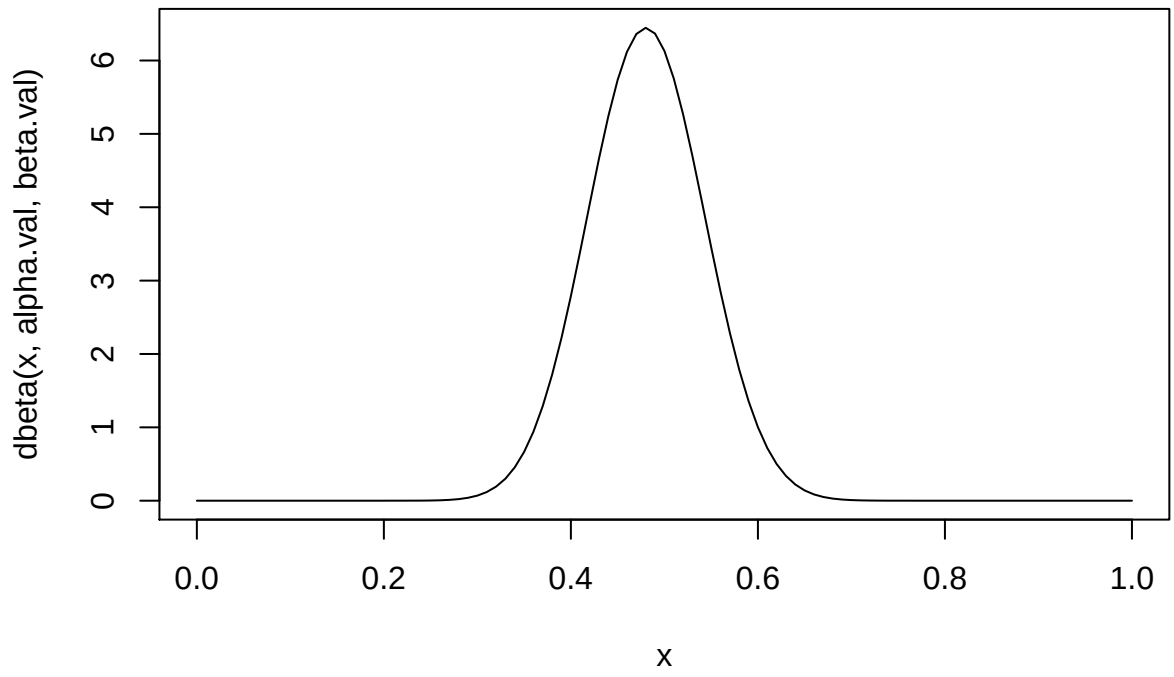
```
##  [1]  0.78333748  0.18359032  0.23361645  0.74856072 -0.84027319
##  [6] -2.03938604  2.39829957 -0.09982140  0.55715100 -1.41179104
## [11] -0.08152995  0.29918733  0.42453218
```

Question 5

For the most part, the standardized residuals are within an acceptable range (less than one), with the only two big outliers being the residuals for when n = 5 and n = 6, however overall I believe it fits pretty well

Question 6

```
curve(dbeta(x,alpha.val,beta.val),from=0,to=1)
```



Question 7

```
prob.boy = pbeta(0.6,alpha.val,beta.val)-pbeta(0.4,alpha.val,beta.val)

prob.boy
```

```
## [1] 0.8801068
```

Question 8

*some code copied from lecture notes

```r
random.p = rbeta(samplen, alpha.val, beta.val)

p.hat = MSE = 0

for (i in 1:1000) {
  samp = rbinom(samplen, 12, random.p)
  m = mean(samp)
  v = var(samp)
  p.hat[i] = m/v
}
MSE = mean( (p.hat - prob.boy)^2 )
RMSE = sqrt(MSE)

RMSE
```

```
## [1] 0.780932
```