

## R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)
```

```
##      speed      dist
##  Min.   : 4.0    Min.   :  2.00
## 1st Qu.:12.0    1st Qu.: 26.00
## Median :15.0    Median : 36.00
## Mean   :15.4    Mean   : 42.98
## 3rd Qu.:19.0    3rd Qu.: 56.00
## Max.   :25.0    Max.   :120.00
```

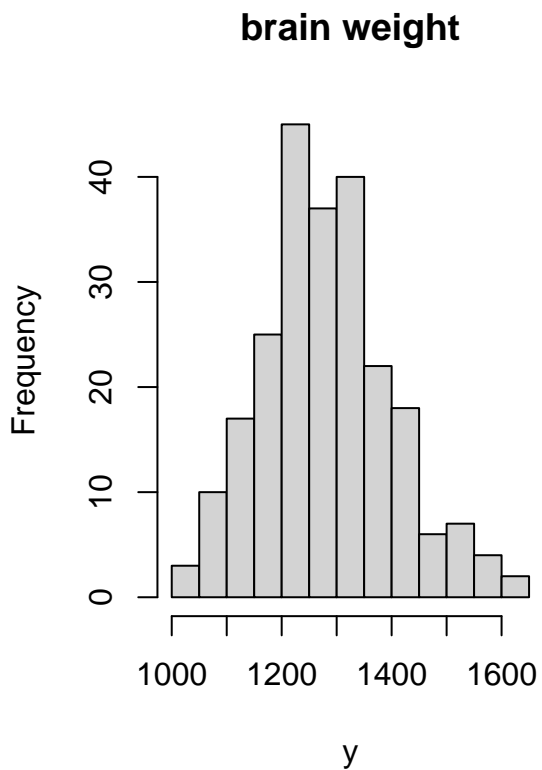
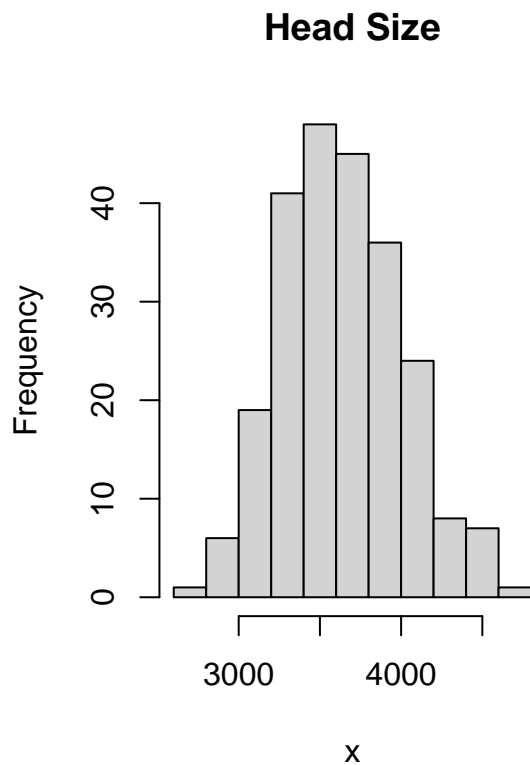
## Including Plots

You can also embed plots, for example:

```
brain = read.csv("brainhead.csv")
x=brain$head.size
y=brain$brain.wgt
```

Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

```
par(mfrow=c(1,2))
hist(x,main="Head Size")
hist(y,main="brain weight")
```



```
par(mfrow=c(1,1))
```

```
xbar=mean(x)
ybar=mean(y)
Sxy=sum((y-ybar)*(x-xbar))
Sxx=sum((x-xbar)*(x-xbar))
n=length(y)
```

```
b1.hat = cov(y,x)/var(x)
c(b1.hat, Sxy/Sxx)
```

```
## [1] 0.2608207 0.2608207
```

```
b0.hat=ybar-b1.hat*xbar
```

```
yfit=b0.hat+b1.hat*x
e=y-yfit
sig.hat=sqrt(sum(e^2)/(n-2))
```

```
M=lm(y~x)
M
```

```
##
## Call:
## lm(formula = y ~ x)
##
```

```

## Coefficients:
## (Intercept)          x
##      335.4323      0.2608

conf = 0.95
qval = -qt(p=(1-conf)/2, df=n-2)

s1 = sig.hat/sqrt(Sxx)

b1.CI = b1.hat+c(-1,1)*qval*s1

round(b1.CI, 3)

## [1] 0.235 0.287

s0=sig.hat*sqrt(1/n+xbar^2/Sxx)

b0.CI = b0.hat + c(-1, 1) * qval * s0
round(b0.CI, 3)

## [1] 241.305 429.559

confint(M)

##              2.5 %      97.5 %
## (Intercept) 241.3053884 429.5592416
## x           0.2350725   0.2865689

Tobs = b1.hat/s1
Tobs

## [1] 19.957

pval=pt(q=abs(Tobs), df=n-2, lower.tail = FALSE)
pval=2*pval
pval

## [1] 2.031713e-52

pred.int = function(xstar,xlevel){
  qval=qt(1-(1-xlevel)/2, df=n-2)
  mu.star = b0.hat + b1.hat * xstar
  s.star = sig.hat*(1+1/n+(xstar-xbar)^2/Sxx) # standard error
  cbind(L=mu.star - qval * s.star,
        U=mu.star + qval * s.star)
}
pred.result = pred.int(120, 0.95)

```