```
help(cars)
cars
head(cars)
cars$speed
cars$dist
summary(cars)

mean(cars$dist)
var(cars$dist)
hist(cars$dist)
#and could also look at
hist(cars$speed)

plot(x=cars$speed, y=cars$dist)
plot(x=cars$speed, y=cars$dist, main="Dist ~ Speed") #adding a label

scatter.smooth(x=cars$speed, y=cars$dist, main="Dist ~ Speed")  # scatterplot
# this has added a smooth to the data

lm(cars$dist ~ cars$speed)
summary(lm(cars$dist ~ cars$speed))
#note how summary works differently for differnt "objects"

residuals <- cars$dist - (-17.5791 + 3.9324*cars$speed)
mean(residuals)
hist(residuals)   #histogram of residuals

yhat <- -17.5791 + 3.9324*cars$speed
plot(x=yhat, y=residuals)

regression <- lm(cars$dist ~ cars$speed) # regression is an R "object"
```

```
summary(regression)
resid <-resid(regression)
yhat <-fitted(regression)

resid
residuals  #see how these are the same

speedSQ <- cars$speed*cars$speed

lm(cars$dist ~ cars$speed + speedSQ)

quadratic <-lm(cars$dist ~ cars$speed + speedSQ)
summary(quadratic)
yhatQUAD <-fitted(quadratic)
residQUAD <- resid(quadratic)

plot(x=yhat, y=residuals, main="results from linear regression")
plot(x=yhatQUAD, y=residQUAD, main="results from quadratic regression")

plot(x=cars$speed, y=yhat, main="fits from linear regression")
plot(x=cars$speed, y=yhatQUAD, main="fits from linear regression")

plot(x=cars$speed, y=cars$dist)
abline(regression)

plot(x=cars$speed, y=cars$dist)
abline(quadratic)   #why doesn't this work?   We have more than just a & b, intercept and slope.

plot(x=cars$speed, y=cars$dist)
abline(regression)
```