# Problem 1.27

Read the data into R

```r
Data = read.table("~/Documents/School/Sta108utts/CH01PR27.txt")
```

Check that is read properly. Also check which column is Y.

```r
Data
```

Re-name the columns of the Data

```r
names(Data) = c("Y","X")
```

#(a) Fit the regression model. Obtain the estimates. Plot the estimated regression function and the data

```r
Muscle = lm(Y ~ X, data = Data)
```

Print summary of estimated coefficients

```r
table(Muscle)
```

#Plot data and regression line

```r
plot(Data$X, Data$Y, main="Problem 1.19(a)",
     xlab="Age (years)", ylab="Measure of Muscle Mass", pch=19)
lines(Data$X, Muscle$fitted.values)
```

#(b)

#(1) find estimate of slope

```r
b1 = Muscle$coefficients[2]
```

#(2) find estimate of Y^h when Xh = 60

```r
b0-b1*60
```

#(3) get 8th residual

```r
Data$Y[8]-Muscle$fitted.values[8]
```

#(4) find mse

```r
summary(Muscle)
```

#OR: use ANOVA table, anova() output, read inside table for [Mean Square] of [Residuals]

```r
anova(Muscle)
```
#Problem From Ch.2

#a)  
#Test statistic, $t^*$, is printed as t-value in summary() output  
#For decision rule: Find t-value (based on given alpha=0.05) used in decision rule:  
#we have a left-tailed test: so need the left tail of t-distr. to be 0.05:  
#$t(\alpha, n-2)=t_{(0.05,58)}$  
#\begin{align*}  
#& \text{qt(0.05,58)} 
#\end{align*} 

#c)  
#Find confidence intervals for $\beta_1$  
#Multiplier is $t(1-\alpha/2, n-2)$  
#\begin{align*}  
#& \text{qt(1-0.05/2,58)} 
#\end{align*} 
#CI:  
#\begin{align*}  
#& (b_1 - qt(1-0.05/2,58)*0.0902) \quad (b_1 + qt(1-0.05/2,58)*0.0902) 
#\end{align*} 
#OR: get confidence interval of both parameters $\beta_0$ and $\beta_1$ by command:  
#\text{confint()}, read the second line  
#\text{confint(Muscle)}