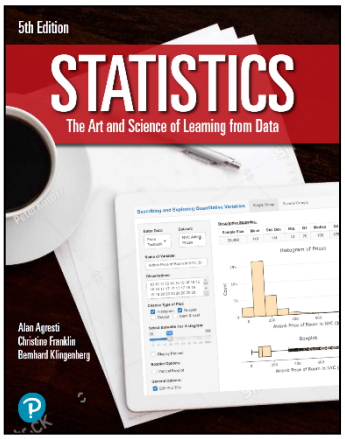

R Code for Examples in the book
"Statistics: The Art and Science of Learning from Data"
by Agresti, Franklin and Klingenberg, 5th edition

Chapter 13

Example 4: Female Athletes' Weight – Estimating Residual Standard Deviation

Reading in data

```
athletes <-
read.csv(file='https://raw.githubusercontent.com/artofstat/data/master/Chapter13/college_female_athletes.csv')
colnames(athletes) #check column names
```

```
##  [1] "TBW"      "HGT"      "X.BF"     "BF"       "LBM"      "REPS55"
##  [7] "REPS70"   "X1RM"     "X1RM.TBW" "X1RM.LBM" "AGE"
```

Fitting in multiple regression model

```
linReg <- lm(TBW ~ HGT + BF + AGE, data = athletes)
linReg
```

```
##
## Call:
## lm(formula = TBW ~ HGT + BF + AGE, data = data)
##
## Coefficients:
## (Intercept)          HGT           BF          AGE
##    -97.6938       3.4285     136.4265      -0.9601
```

To get the ANOVA table for the regression model

```
aov <- anova(linReg)
aov # viewing ANOVA table
```

```
## Analysis of Variance Table
##
## Response: TBW
##           Df  Sum Sq Mean Sq  F value    Pr(>F)
## HGT        1 10281.1 10281.1 100.6140 1.904e-14 ***
## BF         1  1902.7  1902.7  18.6203 6.054e-05 ***
## AGE        1   224.1   224.1   2.1933    0.1438
## Residuals 60  6131.0   102.2
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
rss <- aov$`Sum Sq`[4]
dfError <- aov$Df[4]
```

To estimate standard deviation

```
s <- sqrt(rss / dfError)
s

## [1] 10.10861
```