```
> if (FALSE)
+ {"
+ Perform simple linear regression for Ex3.89 page 160 of text
+ x=Breast Height Diameter
+ y=Height
+ "}
>
> library(faraway)  #this command brings in a library of regression functions
>
> #read in the data which is in a csv file
> #change the directory below to your directory
> ex389 <- read.csv(file="C:/Users/jmard/Desktop/RegressionMethodsSpring2020/Homework/WHITESPRUCE
.csv",header = TRUE)
>
> ex389
   DIAMETER HEIGHT
1      18.9   20.0
2      15.5   16.8
3      19.4   20.2
4      20.0   20.0
5      29.8   20.2
6      19.8   18.0
7      20.3   17.8
8      20.0   19.2
9      22.0   22.3
10     23.6   18.9
11     14.8   13.3
12     22.7   20.6
13     18.5   19.0
14     21.5   19.2
15     14.8   16.1
16     17.7   19.9
17     21.0   20.4
18     15.9   17.6
19     16.6   18.8
20     15.5   16.9
21     13.7   16.3
22     27.5   21.4
23     20.3   19.2
24     22.9   19.8
25     14.1   18.5
26     10.1   12.1
27      5.8    8.0
28     20.7   17.4
29     17.8   18.4
30     11.4   17.3
31     14.4   16.6
32     13.4   12.9
33     17.8   17.5
34     20.7   19.4
35     13.3   15.5
36     22.9   19.2
> summary(ex389)
    DIAMETER         HEIGHT
 Min.   : 5.80   Min.   : 8.00
 1st Qu.:14.80   1st Qu.:16.88
 Median :18.70   Median :18.65
 Mean   :18.20   Mean   :17.91
 3rd Qu.:20.77   3rd Qu.:19.82
 Max.   :29.80   Max.   :22.30
>
> mod <- lm(HEIGHT ~ DIAMETER, data=ex389)
> plot(HEIGHT ~ DIAMETER,data=ex389)  #keep in mind - R is case sensitive SAS is not
> abline(mod)
>
> #save graph in pdf
>  pdf(file="C:/Users/jmard/Desktop/RegressionMethodsSpring2020/Homework/Ex3_89_graph.pdf")
> plot(HEIGHT ~ DIAMETER,data=ex389)
> abline(mod)
```

HW01: Exercise 3.89 on page 160 of text. (This is Exercise 3.56 from 7th edition) Data are in a .csv file. WHITESPRUCE.csvPreview the document
Generate a 95% CI instead of a 90% CI for part (e).
Also answer the following additional questions:
(f) Test H0: B1=0 using alpha=0.05.
(g) Compute R2

```
> dev.off() #closes pdf file)
windows
      2
>
> summary(mod)

Call:
lm(formula = HEIGHT ~ DIAMETER, data = ex389)

Residuals:
    Min      1Q  Median      3Q     Max
-3.9394 -0.9763  0.2829  0.9950  2.6644

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  9.14684    1.12131   8.157 1.63e-09 ***
DIAMETER     0.48147    0.05967   8.069 2.09e-09 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.678 on 34 degrees of freedom
Multiple R-squared:  0.6569,    Adjusted R-squared:  0.6468
F-statistic:  65.1 on 1 and 34 DF,  p-value: 2.089e-09

> anova(mod)
Analysis of Variance Table

Response: HEIGHT
          Df  Sum Sq Mean Sq F value    Pr(>F)
DIAMETER   1 183.245 183.245  65.101 2.089e-09 ***
Residuals 34  95.703   2.815
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
>
> new.dat <- data.frame(DIAMETER=20)  #creates an observation where DIAMETER=20
> new.dat
  DIAMETER
1       20
>
> predict(mod, newdata = new.dat, interval = 'confidence')
       fit      lwr      upr
1 18.77632 18.16746 19.38519
>
> #predict(mod, newdata = new.dat, interval = 'prediction')
>
>
>
>
>
```

I requested a 95% CI

```
>
> predict(mod, newdata = new.dat, interval = 'prediction')
       fit      lwr      upr
1 18.77632 15.31282 22.23983
>
```