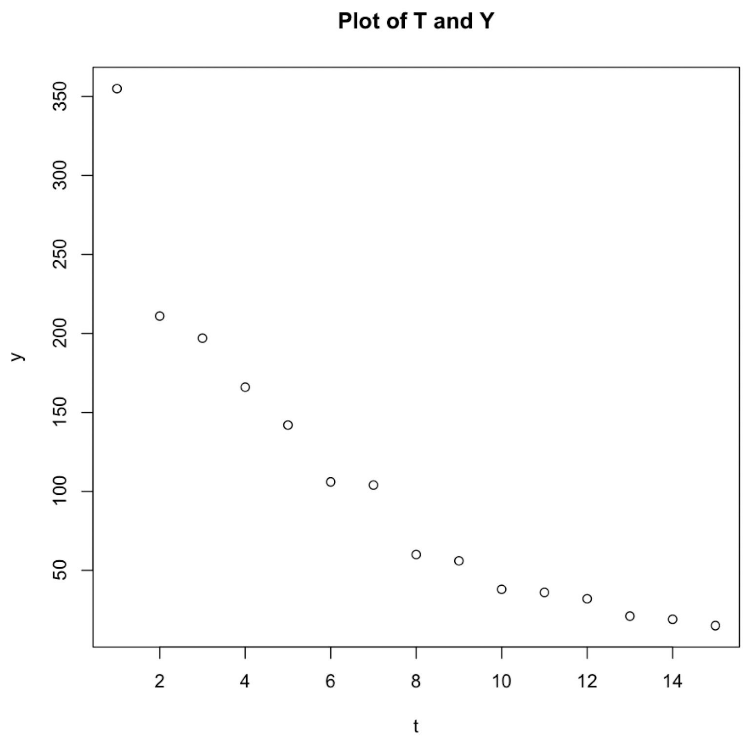
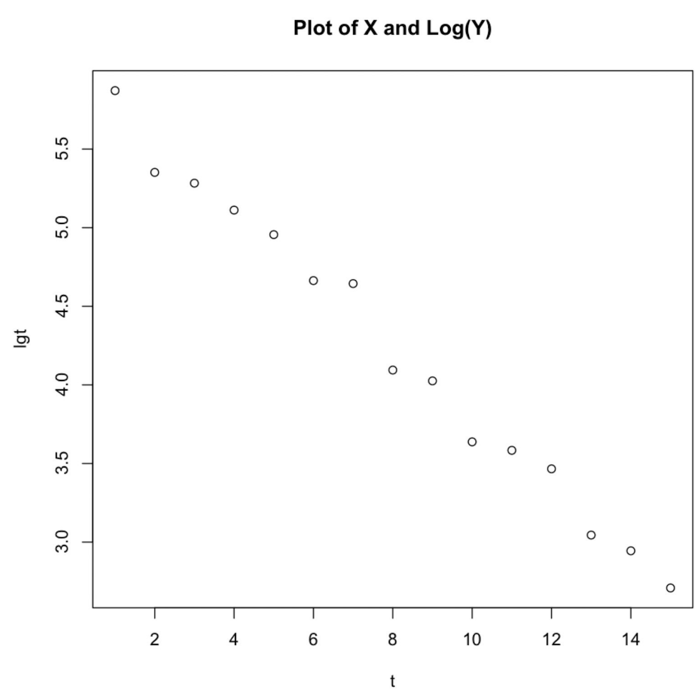
5.)

A.)


Plot of T and Y
y
350
300
250
200
150
100
50
2
4
6
8
10
12
14
t


Plot of X and Log(Y)
lgt
5.5
5.0
4.5
4.0
3.5
3.0
2
4
6
8
10
12
14
t

From here it's easy to see that while both plots have aspects that suggest they both have a linear relationship, the plot of T and the Log(Y) have a much more linear relationship.

prob5.R ● BacteriaDeath.txt ● BacteriaDeath.csv

prob5.R

```r
Bacteriatable = read.csv("BacteriaDeath.csv",header = FALSE)


t = Bacteriatable[,1]
y = Bacteriatable[,2]
lgy = log(y)

plot(t,y , title("Plot of T and Y"))

plot(t,lgt , title("Plot of X and Log(Y)"))

summary(lm(lgy~x))
# the coefficient  of t is -0.218425
# the intercept is  5.973160

```

PROBLEMS 24 OUTPUT DEBUG CONSOLE TERMINAL 1: R

```
> plot(t,y , title("Plot of T and y"))
> plot(t,y , title("Plot of T and Y"))
> lgy = log(y)
> plot(t,lgt , title("Plot of X and Log(Y)"))
> summery(lm(lgy~x))
Error in summery(lm(lgy ~ x)) : could not find function "summery"
> summery(lm(lgy~t))
Error in summery(lm(lgy ~ t)) : could not find function "summery"
> summary(lm(lgy~t))

Call:
lm(formula = lgy ~ t)

Residuals:
     Min       1Q   Median       3Q      Max
-0.18445 -0.06189  0.01253  0.05201  0.20021

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  5.973160   0.059778   99.92  < 2e-16 ***
t           -0.218425   0.006575  -33.22 5.86e-14 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.11 on 13 degrees of freedom
Multiple R-squared:  0.9884,    Adjusted R-squared:  0.9875
F-statistic:  1104 on 1 and 13 DF,  p-value: 5.86e-14
```

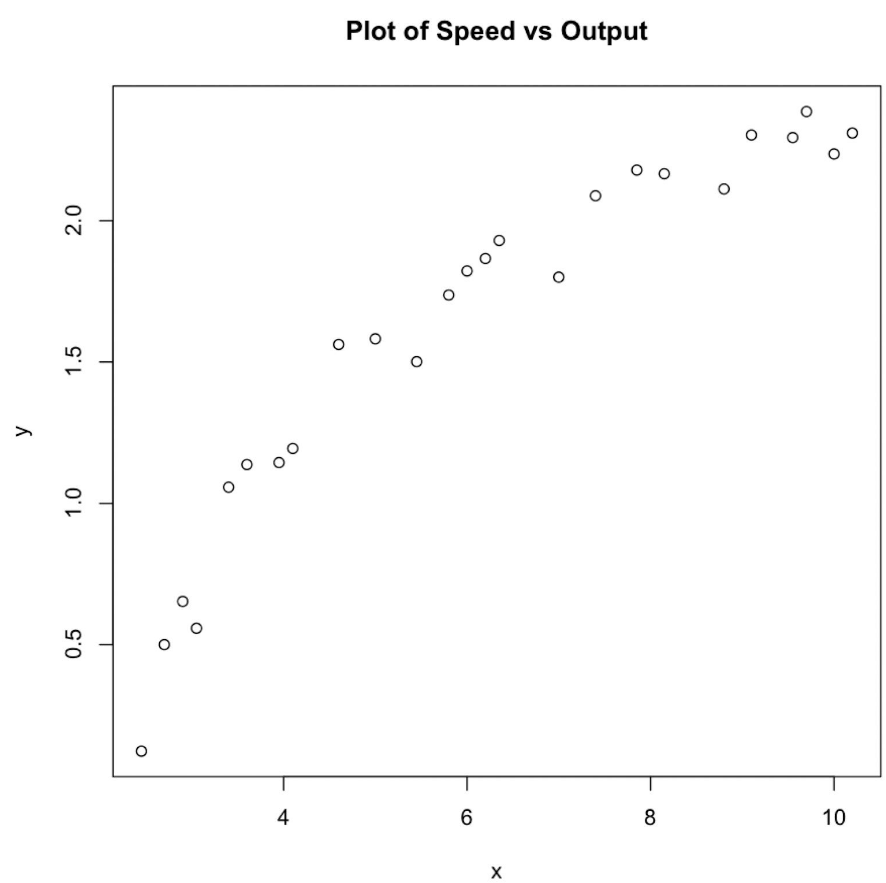
B.) we can construct a predictive model from the information above where the intercept of our model is 5.973160 and the coefficient is -0.218425 thus far we have that

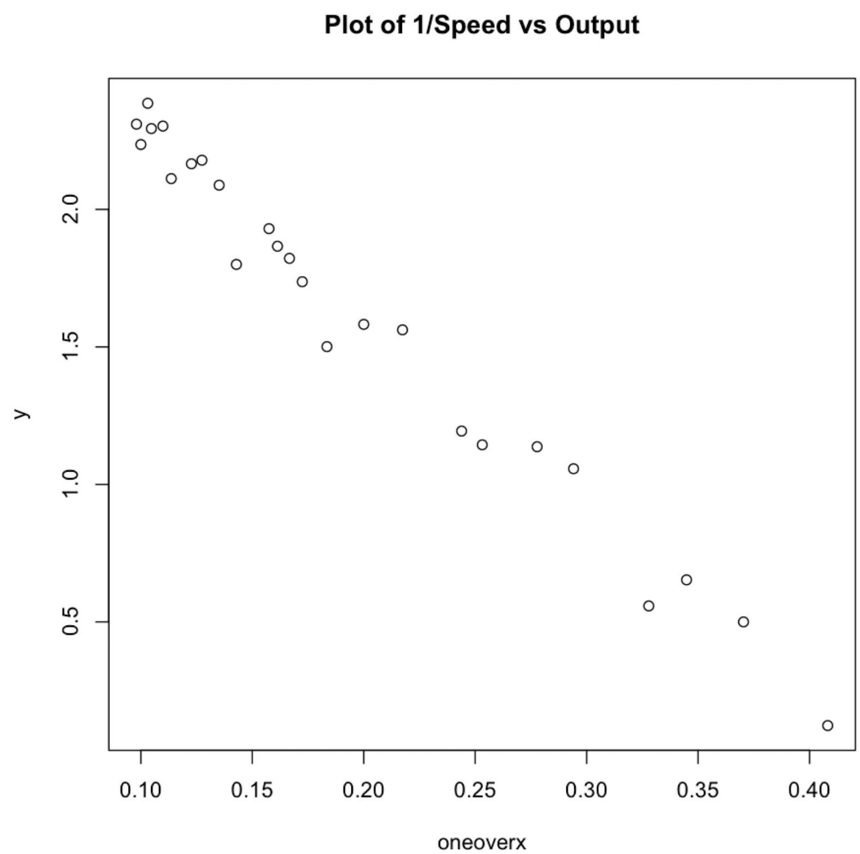
$$\log(y) = -0.218425(t) + 5.973160$$

But to get the predictive model of the plot of T and Y we need to apply the exponent to both side of this equation getting

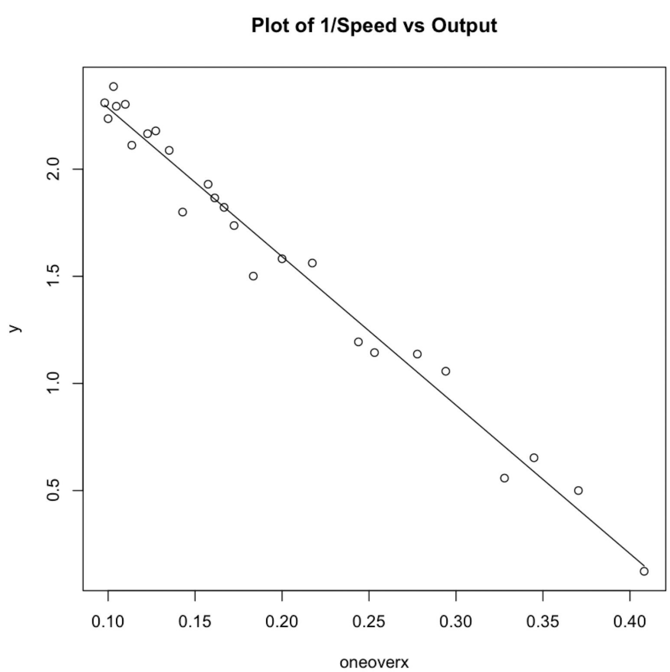
$$y = e^{-.0218425(t) + 5.973160} + \text{error.}$$

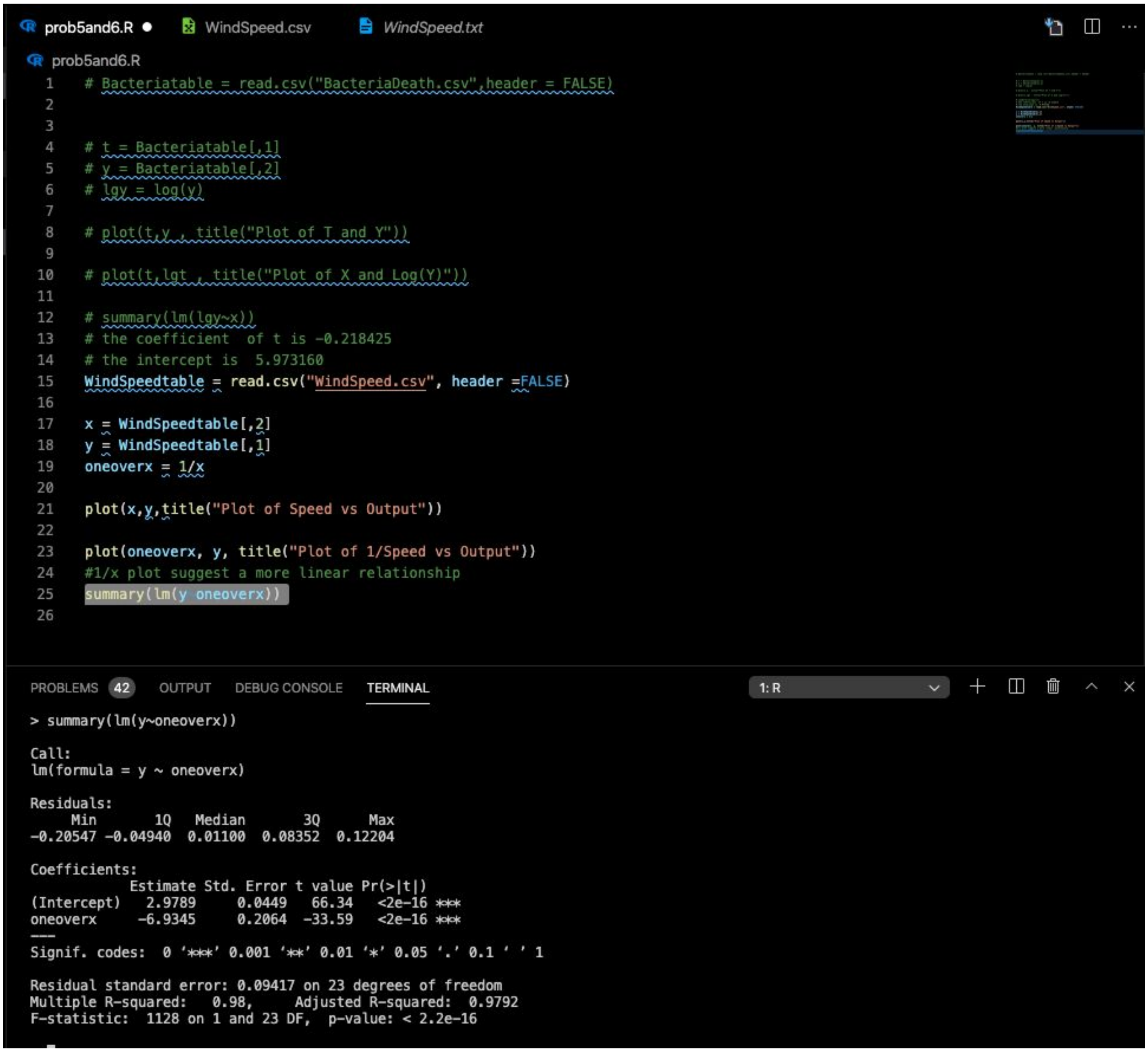
6.) A.) After plotting the x,y and 1/x,y , the plot that seemed to have a more linear relationship is the plot of 1/x,y.





b.) the fitted model model:






```r
# Bacteriatable = read.csv("BacteriaDeath.csv",header = FALSE)


# t = Bacteriatable[,1]
# y = Bacteriatable[,2]
# lgy = log(y)

# plot(t,y , title("Plot of T and Y"))

# plot(t,lgt , title("Plot of X and Log(Y)"))

# summary(lm(lgy~x))
# the coefficient  of t is -0.218425
# the intercept is  5.973160
WindSpeedtable = read.csv("WindSpeed.csv", header =FALSE)

x = WindSpeedtable[,2]
y = WindSpeedtable[,1]
oneoverx = 1/x

plot(x,y,title("Plot of Speed vs Output"))

plot(oneoverx, y, title("Plot of 1/Speed vs Output"))
#1/x plot suggest a more linear relationship
summary(lm(y oneoverx))

```

```
> summary(lm(y~oneoverx))

Call:
lm(formula = y ~ oneoverx)

Residuals:
     Min       1Q   Median       3Q      Max
-0.20547 -0.04940  0.01100  0.08352  0.12204

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   2.9789     0.0449   66.34   <2e-16 ***
oneoverx     -6.9345     0.2064  -33.59   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.09417 on 23 degrees of freedom
Multiple R-squared:   0.98,     Adjusted R-squared:  0.9792
F-statistic:  1128 on 1 and 23 DF,  p-value: < 2.2e-16
```

After finding the intercept this model has the following equation:

$$y = -6.9345*(1/x) + 2.9789 + \text{error}$$

c.) we can plug in the value of 8 miles per hour to get the predicted value of y , this turns out to be 2.112087.

I wanted to mention that I had trouble parsing the data in the form of a text file so I opted to turn them into csvs. I have included my code along with this pdf in a zip file.