1.)

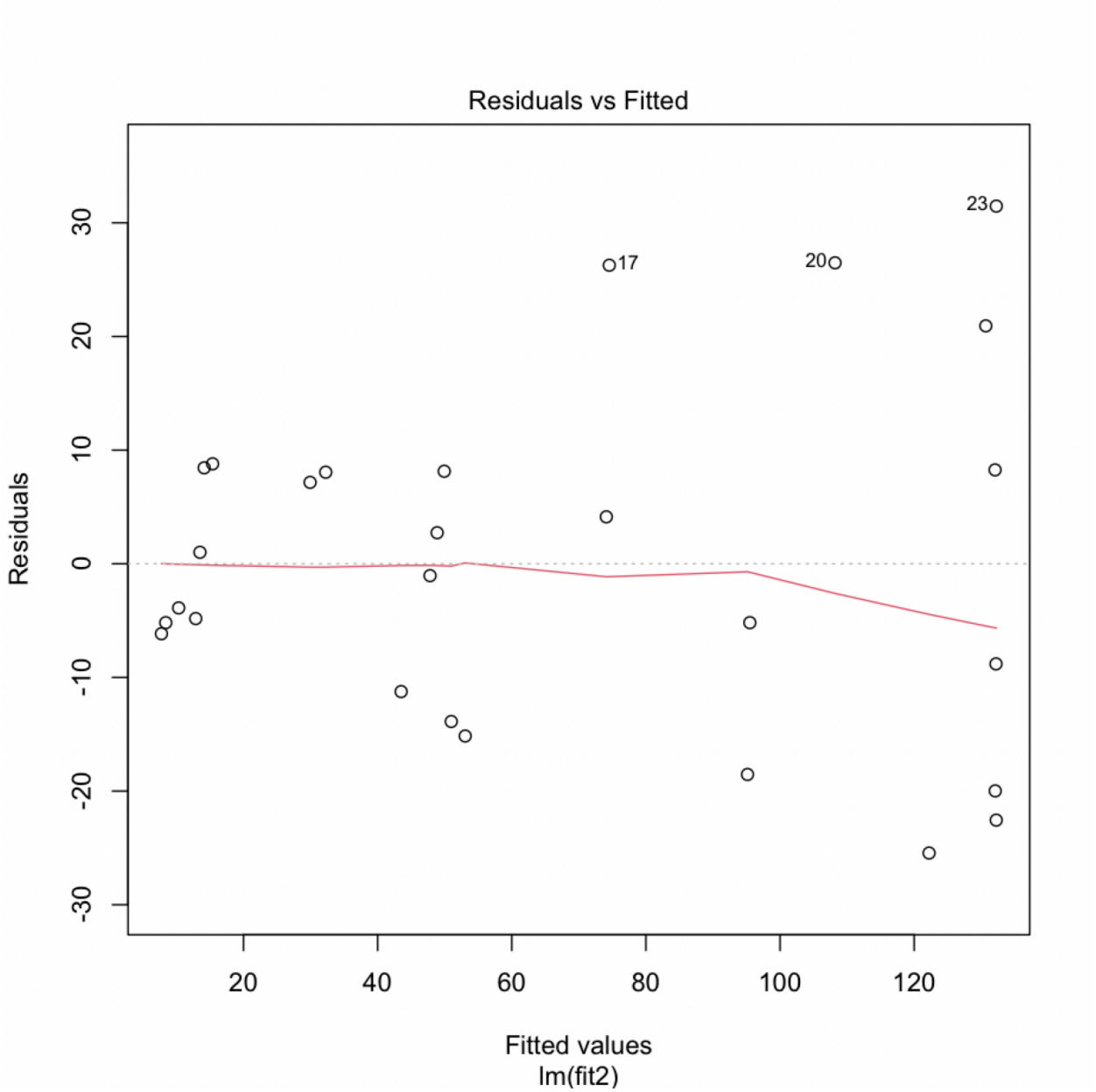
Polynomial	AIC	BIC
1	239.5899	243.4774
2	230.0744	235.2577
3	231.8443	238.3235
4	233.4604	241.2355
5	235.2434	244.3142
6	237.2078	247.5745
7	234.6909	246.3534
8	234.698	247.6563

the polynomial with the lowest BIC and AIC is the 2nd order polynomial.

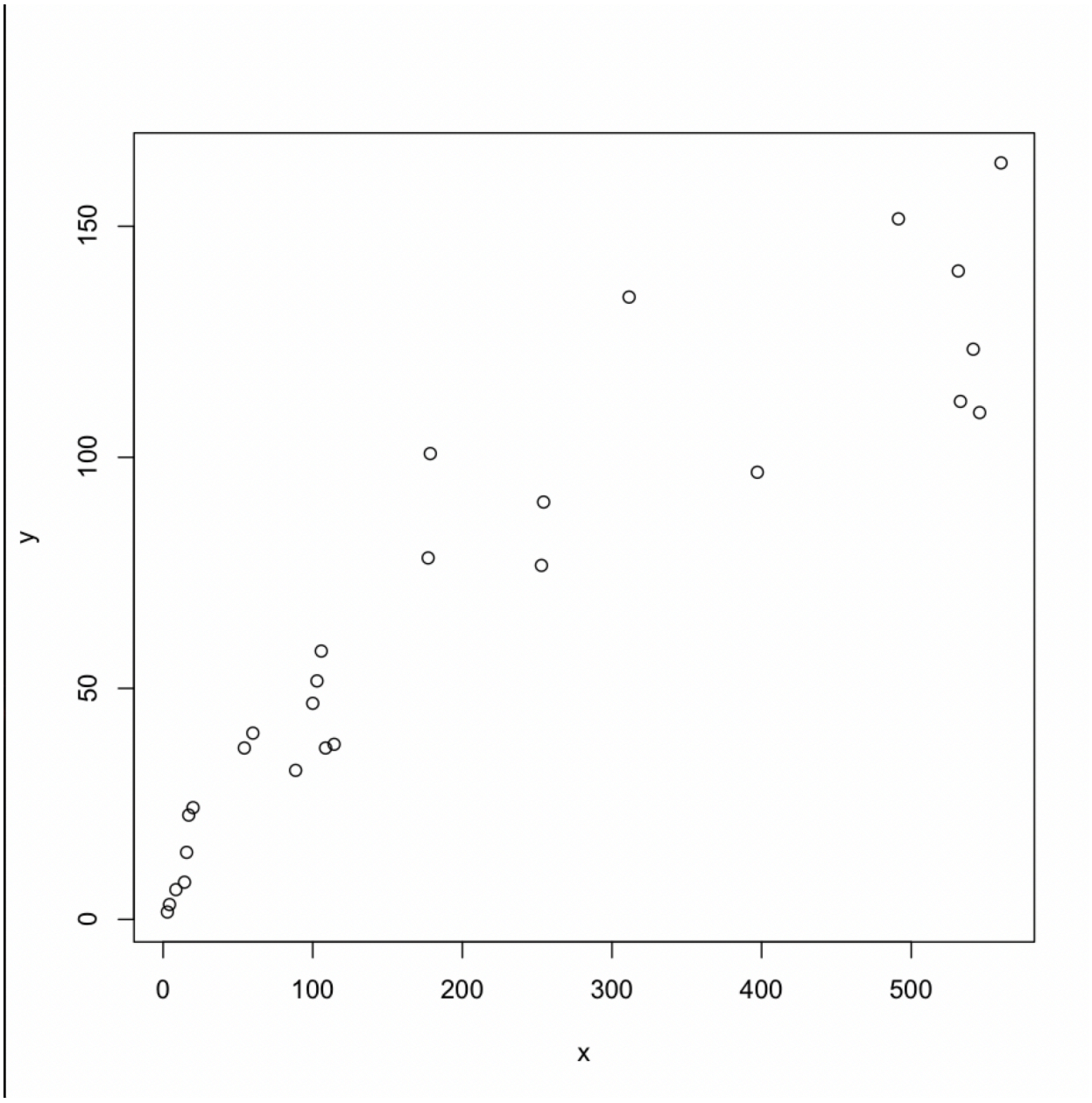
2.)$H_0 : B_2 = 0$. $H_1 : B_2 \neq 0$ after doing the summary of ft2 we can see the p-value for B_2 is 0.00154 which is much less than the significance of 0.05, meaning we can reject the null hypothesis.

```
> summary(fit2)

Call:
lm(formula = y ~ poly(x, 2))

Residuals:
    Min      1Q  Median      3Q     Max
-25.451 -10.027  -1.046   8.201  31.469

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   66.667      3.018  22.091  < 2e-16 ***
poly(x, 2)1  233.611     15.681  14.898 1.26e-13 ***
poly(x, 2)2  -56.025     15.681  -3.573  0.00154 **
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 15.68 on 24 degrees of freedom
Multiple R-squared:  0.9072,    Adjusted R-squared:  0.8995
F-statistic: 117.4 on 2 and 24 DF,  p-value: 4.062e-13
```

3.)Plot of residuals vs predicted values for the second order polynomial model.As apparent from the image below there seems to be no real pattern associated with the predicted values and the residuals. The most notable thing about the plot is that most of the data is close to the 0 line on the y axis and the plated line shows a slight negative trend.



4.) the predicted age for a tree that has a diameter of 110 is 51.49921 with a 95% confidence interval with bounds : [18.17506,84.82335]. Notice that this CI has a very wide range of values considering its predicted value, this can be made more clear when looking at the plot of the data. The more x increases the more variance we get . In this particular plot the variance seems to increase by a lot around the x=114 mark, explaining why we have such a wide CI for the predicted value at x= 110.


y
0
50
100
150
0
100
200
300
400
500
x