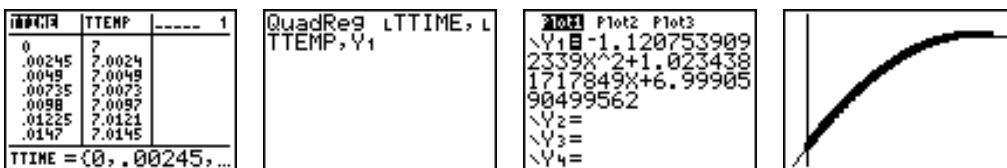
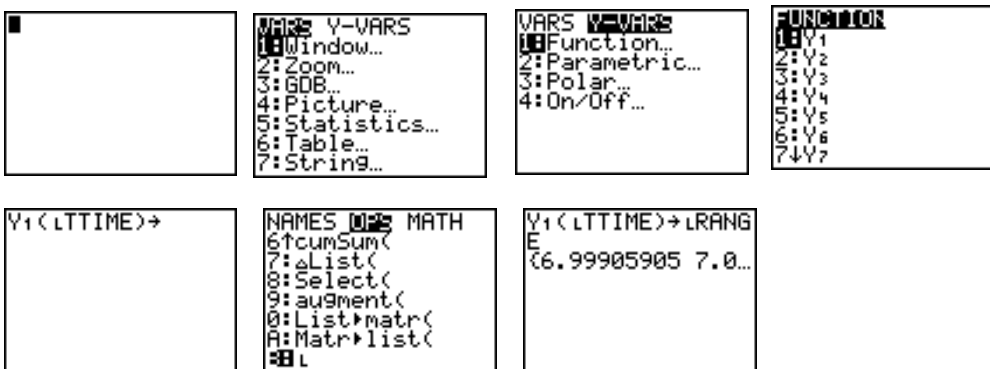


# Residuals Step - by - Step TI-83

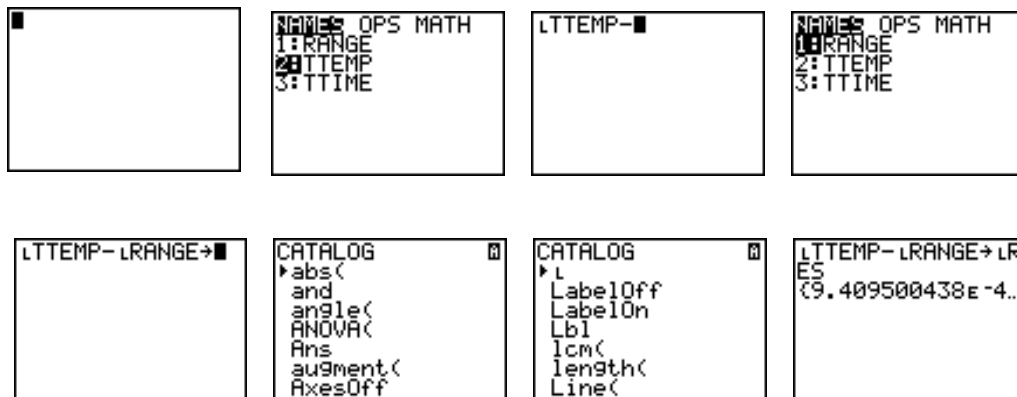
I. Place your data from the experiment in an Xlist and a Ylist, and your best fit equation in Y1.



II. Now we wish to generate a set of values from the function in Y1 using the values in the Xlist for X. Store these “calculated” values in a third list.



III. Find the difference in the measured values in Ylist and the calculated values in LRange.



IV. Your fourth list will contain the Residuals. We want to examine these values by setting up a Scatter Plot using the Xlist values for X.

```

5: NAMES OPS MATH
1: Plot1...On
  L1 TTIME TTEMP
2: Plot2...Off
  L1 L2
3: Plot3...Off
  L1 L2
4: PlotsOff

```

```

2: NAMES OPS MATH
Type: Off
Xlist: TTIME
Ylist:
Mark:

```

```

5: NAMES OPS MATH
1: RANGE
2: RES
3: TTEMP
4: TTIME

```

```

2: NAMES OPS MATH
Type: Off
Xlist: TTIME
Ylist: RES
Mark:

```

```

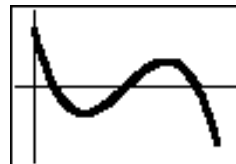
2: NAMES OPS MATH
Y1=-1.120753909
2339X^2+1.023438
1717849X+6.99905
90499562
Y2=
Y3=
Y4=

```

```

2: NAMES OPS MATH
4: ZDecimal
5: ZSquare
6: ZStandard
7: ZTrig
8: ZInteger
9: ZoomStat
0: ZoomFit

```



Looking for a pattern, or the lack of one, will help one see if the fit is good. In this case it should be obvious the relationship is not quadratic.

V. Now look at the sum of the Residuals. One method would be to add the absolute values in LRES.

```

5: NAMES OPS MATH
1: min(
2: max(
3: mean(
4: median(
5: sum(
6: Prod(
7: stdDev(

```

```

sum(

```

```

CATALOG
abs(
and
angle(
ANOVA(
Ans
augment(
AxesOff

```

```

sum(abs(

```

```

5: NAMES OPS MATH
1: RANGE
2: RES
3: TTEMP
4: TTIME

```

```

sum(abs(LRES))
.0628600874

```

VI. Determine the size of this value, relative to the values in the Ylist.

```

sum(abs(LRES))
.0628600874
Ans/

```

```

5: NAMES OPS MATH
1: SortA(
2: SortD(
3: dim(
4: Fill(
5: seq(
6: cumSum(
7: List(

```

```

sum(abs(LRES))
.0628600874
Ans/dim(

```

```

5: NAMES OPS MATH
1: RANGE
2: RES
3: TTEMP
4: TTIME

```

```
sum(abs(LRES))
.0628600874
Ans/dim(LRES)
3.127367533E-4
■
```

```
sum(abs(LRES))
.0628600874
Ans/dim(LRES)
3.127367533E-4
Ans/■
```

```
NAMES OPS MATH
1:min(
2:max(
3:mean(
4:median(
5:sum(
6:Prod(
7↓stdDev(
```

```
1:RANGE
2:RES
3:TTMP
4:TTIME
```

```
sum(abs(LRES))
.0628600874
Ans/dim(LRES)
3.127367533E-4
Ans/mean(LTEMP)
*100■
```

This % error should be consistent with the pattern in the plot of the Residuals above.

VII. We would also like to look at the sum of the squares of the Residuals.

```
NAMES OPS MATH
1:min(
2:max(
3:mean(
4:median(
5:sum(
6:Prod(
7↓stdDev(
```

```
sum(LRES^2)
2.657815131E-5
```

This value needs to be compared to the relative magnitudes of the measured values in the Ylist.

Note: The TI-83 creates a Residual List every time you calculate a regression!