Objective: Interpret a quadratic function from an algebraic, numerical, graphical, and verbal perspective and extract information relevant to the phenomenon modeled by the function.

Example A. Using the same data from Linear Function Review. Consider the data which represents the average monthly high temperatures in one Southern US city during the year 2020.

Jan	Feb	Mar	Apr	May	Jun
47	52	61	71	78	86
Jul	Aug	Sep	Oct	Nov	Dec
89	89	82	72	60	49

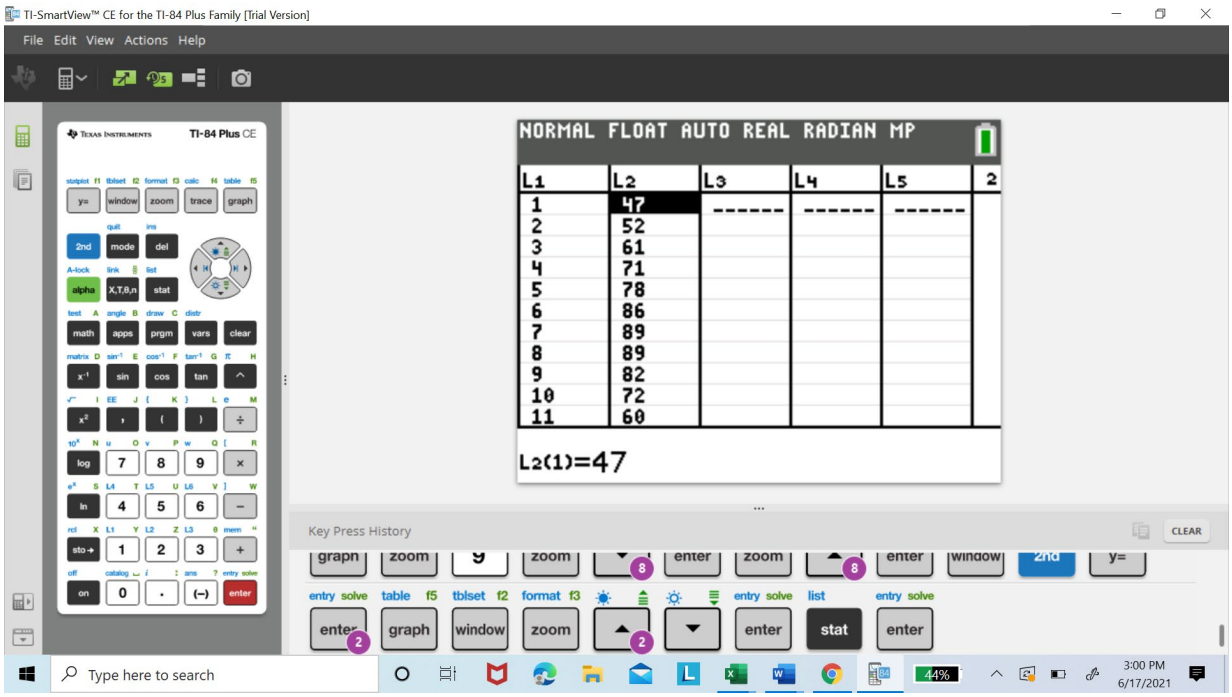
1. We could write this data in an x/y chart or in table form.

Month (Using January =1)	Temperature
1	47
2	52
3	61
4	71
5	78
6	86
7	89
8	89
9	82
10	72
11	60
12	49

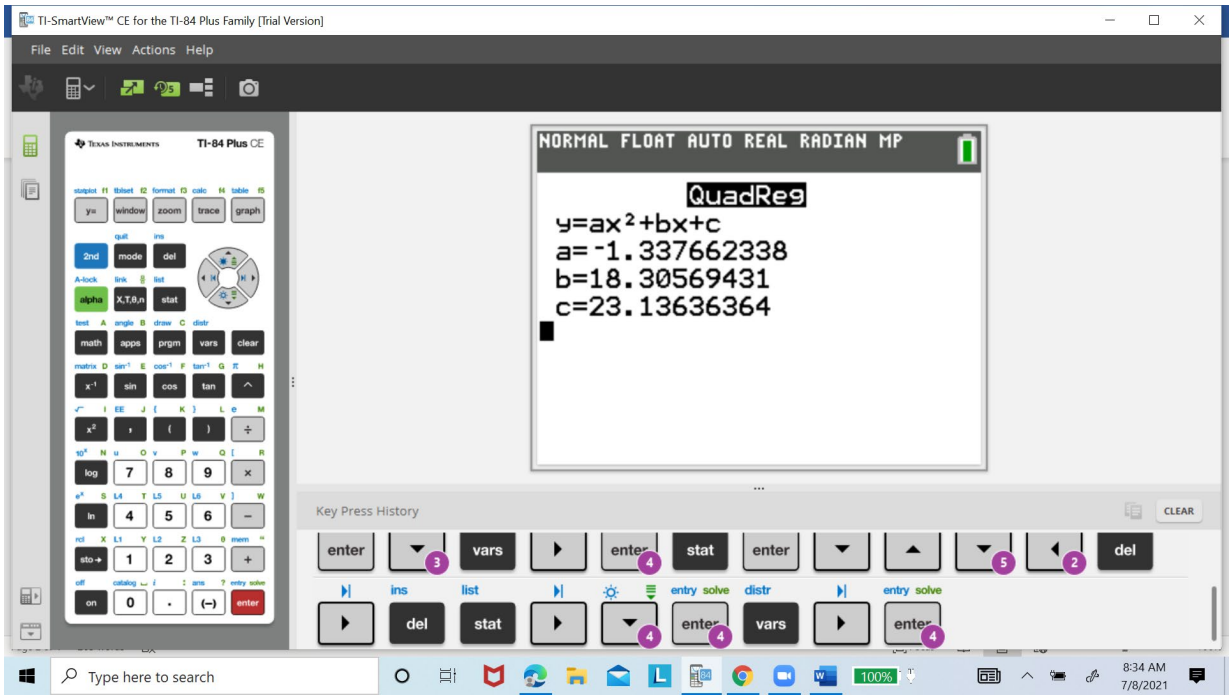
2. Using your calculator, enter this data to create a scatterplot and perform a quadratic regression. Press, STAT, EDIT, and enter your x-values in L1 and y-values in L2.

to turn on scatter plot, 2nd y= (stat plot) selected "ON"

Zoom #9

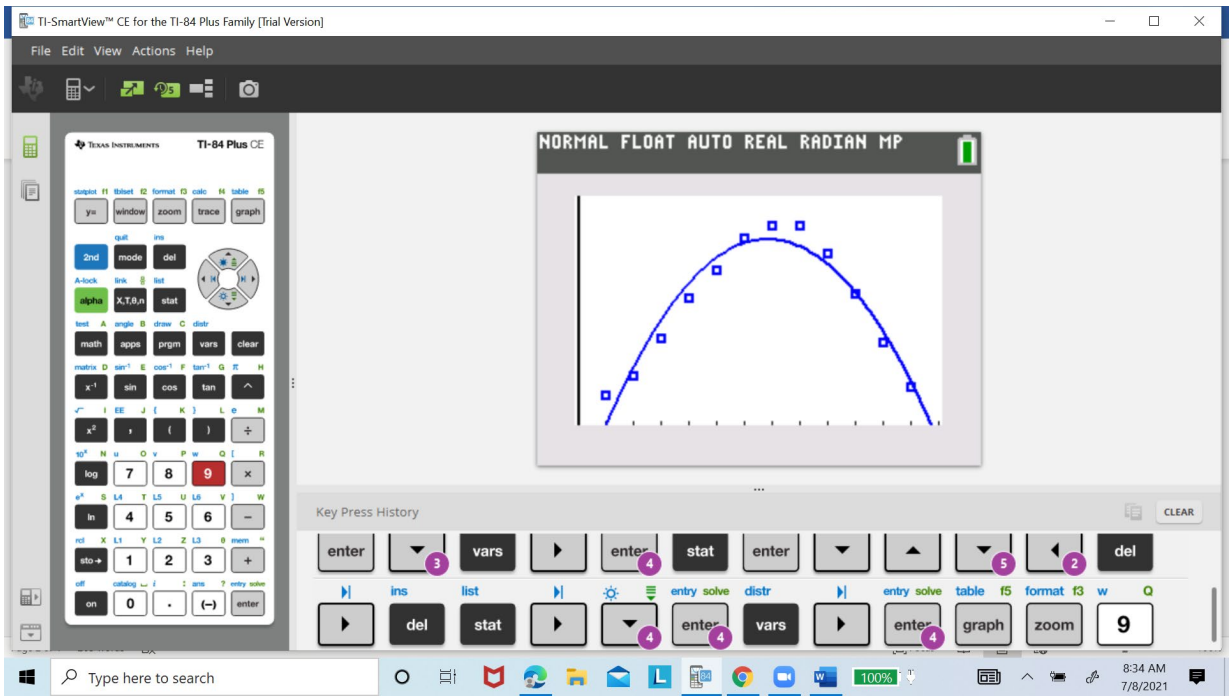


3. Write the predicted regression equation using function notation and graph. Press, STAT, CALC, QUADReg, Xlist: L1, Ylist: L2, StoreRegEq:Y1, Calculate



$y = -1.34x^2 + 18.31x + 23.14$

$f(x) = -1.34x^2 + 18.31x + 23.14$



4. Does this model better fit the data?

yes

x-value
month

5. Using the predicted model, what is f (5) and what does this mean?

$f(5) \approx -1.34(5)^2 + 18.31(5) + 23.14$

$f(5) \approx 81.22$

In May, we would predict the ave monthly high temp $\approx 81.22°$

6. Using the predicted model, what is f (7.5) and what does this mean?

$f(7.5) \approx 85.19$

In mid-July, the ave high temp is $\approx 85.19°$

7. Using the predicted model, when is the temperature most likely to be 65°? Write this in function notation.

go to y=, set $Y_2 = 65$

$f(2.9) \approx 65$

$f(10.8) \approx 65$

At the end of February, the ave monthly high temp = 65.

At the end of October, the ave monthly high temp = 65.

8. Using the predicted model, what is the maximum predicted temperature? When would this occur?

Vertex $x = \frac{-b}{2a}$

2nd, calc, maximum, set left/right boundaries press enter 3x

max. predicted temp = 85.8.

this occurs toward end of June (6.8, 85.8)

9. What is f (18). Does this make sense based on our model? What would be a reasonable domain be for this model?

doesn't make sense

Domain should be months between Jan - Dec.

interval notation $[1, 13)$

include Jan ... $12.9\overline{9}$

does not include