

Problem 3

TEKS Process Standard (1)(C)

Using Quadratic Regression

The table shows a meteorologist's predicted temperatures for an October day in Sacramento, California.

Sacramento, CA	
Time	Predicted Temperature (°F)
8 A.M.	52
10 A.M.	64
12 P.M.	72
2 P.M.	78
4 P.M.	81
6 P.M.	76

How do you write times using a 24-hour clock?

Add 12 to the number of hours past noon. So, 2 P.M. is 14:00 in the 24-hour clock.

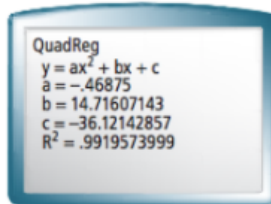
A What is a quadratic model for these data?

When more than three data points suggest a quadratic function, you can use the quadratic regression feature of a graphing calculator to find a quadratic model.

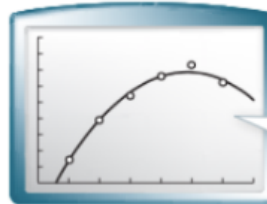
- Step 1** Enter the data. Use the 24-hour clock to represent times after noon.



- STAT --> CALC #5**
Step 2 Use QuadReg.



- Step 3** Graph the data and the function.



A quadratic model is reasonable.

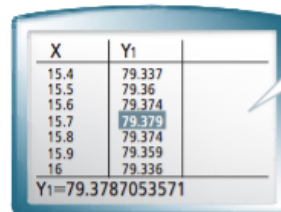
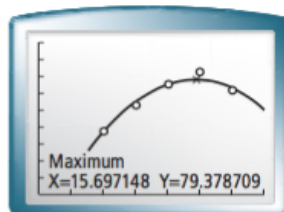
Adjust the window to include a reasonable domain and range

WINDOW
 $X_{min} = -10$
 $X_{max} = 20$
 $X_{scl} = 1$
 $Y_{min} = -10$
 $Y_{max} = 90$
 $Y_{scl} = 1$
 $X_{res} = 1$

A quadratic model for temperature is $y = -0.469x^2 + 14.716x - 36.121$.

B Use your model to predict the high temperature for the day. At what time does the high temperature occur?

Use the **Maximum** feature or tables.



16 represents 4 P.M.
 The maximum occurs at approximately 15.7, or about 3:42 P.M.

Predict the high temperature for the day to be 79.4°F at about 3:42 P.M.