Name: _____ Date: _____

BLM 5–19

Section 5.5 Example 1 Use Technology

Tools

- TI-Nspire™ CAS Graphing Calculator

Example 1 Testing a New Fertilizer

To test a new fertilizer, a biochemical company has planted several test hectares of corn. Individual hectares were sprayed with concentrations of 2%, 3%, 4%, and 5% solutions of the new fertilizer. Crop yields, in bushels per hectare, from each test planting are shown in the table.

Concentration (%)	Yield (bushels/ha)
2	600
3	650
4	691
5	721

a) Create a scatter plot of the data.

b) From your scatter plot, which model appears most appropriate: linear, quadratic, or exponential? Justify your answer.

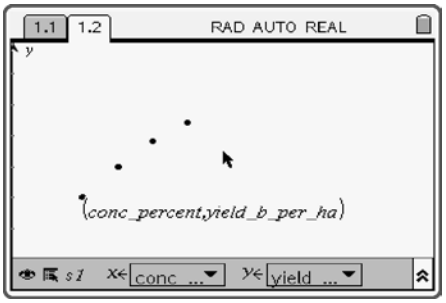
c) Generate a model for the data. Represent the model using a graph and an equation.

d) Use the model to predict the effect of increasing the concentration of fertilizer by several more steps of 1%.

e) Use your model to predict the concentration that will result in the maximum crop yield.

Solution

a)



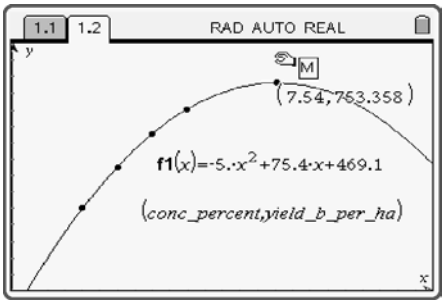
b) The rate of change appears to be decreasing. The most appropriate model appears to be quadratic.

c) Use quadratic regression. The equation is $y = -5x^2 + 75.4x + 469.1$.

d) If concentration continues to increase, the yield will reach a maximum and then decrease.

e) Plot a point on the modelling relation.
Drag the point to determine the maximum.

The maximum yield is about 753 bushels/ha at a concentration of approximately 7.5%.



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