Grade level: Pre-service/secondary
Subject: Algebra
Time required: 45 to 60 minutes

TI-*nspire*™

TI-Nspire Activity: *What's Does Your Representation Tell You?*
By: Janet Andreasen

In examining representations, it is important to examine the connections between symbolic, numeric, and graphic representations.
This activity will examine the connections between these representations and methods for identifying these relationships from any of the representations.

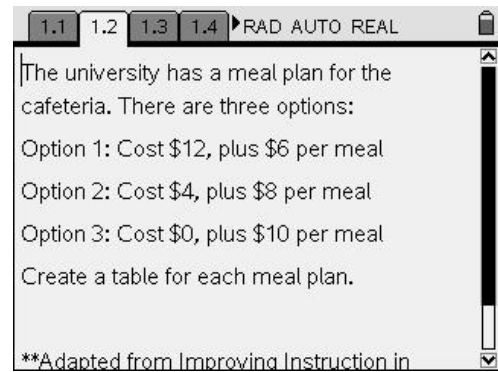Using the TI-Nspire, open the file: Representation.tns

Work through the pages and problems of the file (Ctrl+right arrow), recording your answers to questions on the following pages:

Problem 1
(Page 1.2)
Question 1:
Make a prediction related to which meal plan is a better choice.

> | 1.1 | 1.2 | 1.3 | 1.4 | ▶RAD AUTO REAL
>
> The university has a meal plan for the cafeteria. There are three options:
>
> Option 1: Cost $12, plus $6 per meal
>
> Option 2: Cost $4, plus $8 per meal
>
> Option 3: Cost $0, plus $10 per meal
>
> Create a table for each meal plan.
>
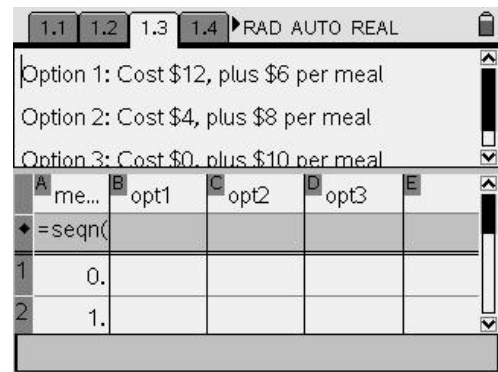> **Adapted from Improving Instruction in

Numeric Representation:
On page 1.3, create a table for each meal plan. Answer the following questions:

Question 2:
Can you determine which meal plan is better? Why?

> | 1.1 | 1.2 | 1.3 | 1.4 | ▶RAD AUTO REAL
>
> Option 1: Cost $12, plus $6 per meal
>
> Option 2: Cost $4, plus $8 per meal
>
> Option 3: Cost $0, plus $10 per meal
>
> | A me... | B opt1 | C opt2 | D opt3 | E |
> | --- | --- | --- | --- | --- |
> | ◆ =seqn(| | | | |
> | 1 0. | | | | |
> | 2 1. | | | | |

Question 3:
What type of relationship (e.g. linear, quadratic, exponential, etc.) is each of the meal plans? Why?

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Graphic Representation

Continue to page 1.4 of the file. Your data which you entered into the table on page 1.3 is graphed here. Answer the following questions:

Question 4:
Which graph is which?

Question 5:
According to the graph, which meal plan is best? Why?

Note: You will have points displayed here based on your table.

Question 6:
How can you tell from the graphic representation the type of relationship? Why?
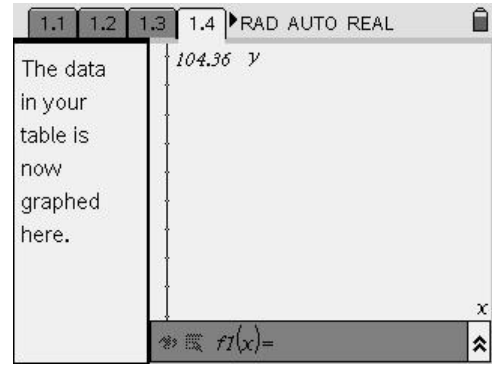
Symbolic Representation

Create a regression line for each meal plan. Follow the steps below:

1. Go to page 1.3. Click on a cell E1 in your table.
2. Click "Menu", "4:Statistics", "1:Stat Calculations". Then choose the type of regression you want based on the relationship observed.
3. For "x list" choose Meals. For "y list" choose the option you want to find the regression for (opt1, opt2, opt3). Label opt1 as F1(x), opt2 as F2(x), and opt3 as F3(x). Begin the results in column F for opt1, column H for opt2, and column J for opt3.
4. Go to page 1.4. Click on the graph side. Click Ctrl-G to show the entry line. Click "Menu", "3:Graph Type", "1:Function".
5. Click in the entry line and press the up arrow three times to show f1(x). Click Enter three times. The equations will show as text on the graph. You can drag them by selecting the text and holding down the "click" button to drag it to a different part of the screen.

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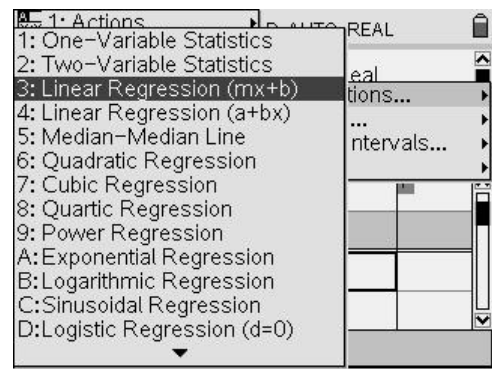
Answer the following questions:
Question 7:
What are your three equations:
F1(x) =
F2(x) =
F3(x) =

Question 8:
How can you tell from the symbolic equation the type of
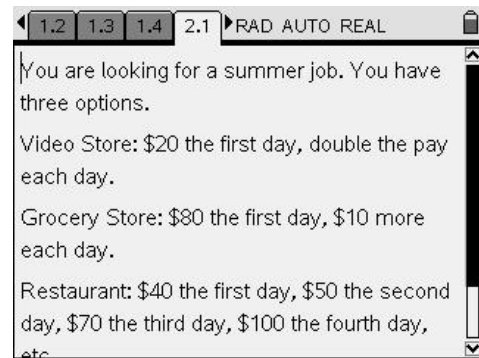relationship? Why?

Question 9:
How can you tell from the equations which meal plan is
better? Why?

Problem Two
(Page 2.1)
Question 1:
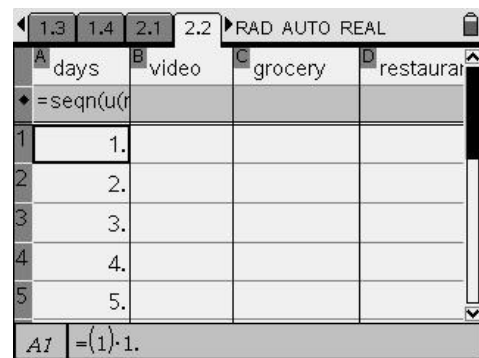Make a prediction related to which job is a better choice.

Numeric Representation:
On page 2.2, create a table for each job. Answer the following
questions:
Question 2:
Can you determine which job is better? Why?

Question 3:
What type of relationship (e.g. linear, quadratic, exponential,
etc.) is each of the jobs? Why?

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Graphic Representation

Continue to page 2.3 of the file. Your data which you entered into the table on page 2.2 is graphed here. Answer the following questions:
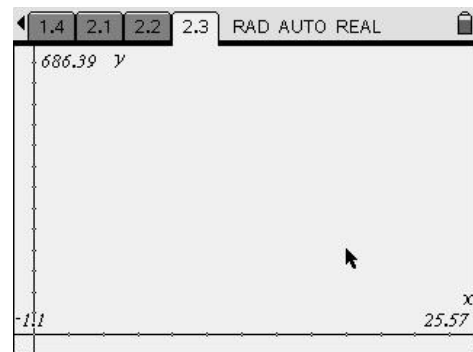
Question 4:
Which graph is which?

Question 5:
According to the graph, which job is best? Why?

Note: You will have points displayed here based on your table.

Question 6:
How can you tell from the graphic representation the type of relationship? Why?

Symbolic Representation

Create a regression line for each job. Follow the same steps as in problem 1 (reference page 2), being sure to choose the type of regression for the relationship you observed. Use F4(x) for video, F5(x) for grocery, and F6(x) for restaurant. Graph F4, F5, and F6.

Answer the following questions:
Question 7:
How well did you predict the relationship? What helped you to determine which relationship to use?

If your graphs do not match your data set, reconsider the type of relationship to see if you predicted incorrectly. If you feel you predicted incorrectly, go back to your table and re-do the regression line(s) that need to be corrected. Once all three graphs match the data, answer the following questions.

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Question 8:
What are your three equations:
F4(x) =
F5(x) =
F6(x) =

Question 9:
How can you tell from the symbolic equation the type of
relationship? Why?

Question 10:
How can you tell from the equations which job is better?
Why?