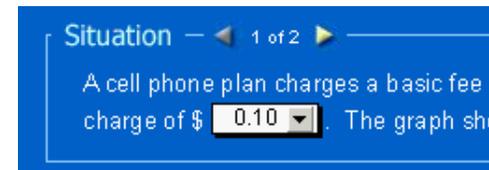
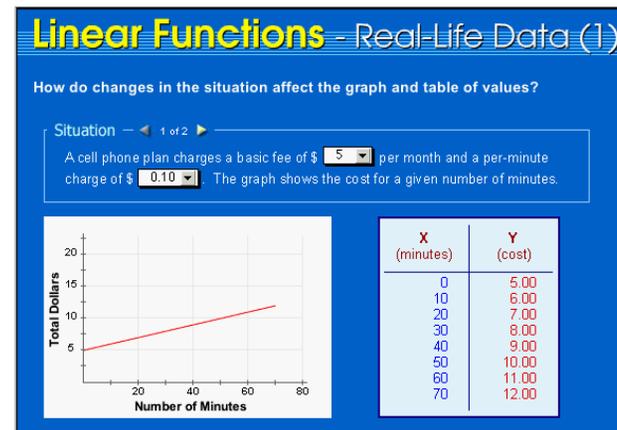


## Solutions to *Real-Life Data* – Session 7

### Real-Life Data, Part 1

#### Read Before Starting:

- Note the question at the top of the applet screen: “How do changes in the situation affect the graph and the table of values?” That is the focus of this applet. By the time you have completed Part 1 of the applet, you should have some conjectures about how changing particular values in the real-life situation will affect the graph. You will have a chance to investigate your conjecture in Parts 2 and 3.
- Read the situation described in the text box. There are two places where you see a number in a white box with a small arrow next to it. If you place the cursor over the arrow and click and hold your mouse, a list of choices of different values will appear. This is called a picklist.
- Note that default values are provided for you in the picklist and the corresponding graph for those values appears on the axes. As you change the values, the graph and the table of values will adjust to the values you selected.
- When you are ready to move to the second situation, click on the right arrow as shown:



**To Do:**

- 1) The basic plan costs \$5 per month plus a per-minute charge of \$0.10. Make a prediction: *What will happen to the cost if the per-minute charge increases to \$0.20? How will that change appear on the graph?* Write down your prediction below. Then select the values from the picklists and see what happens.

**(Your own prediction goes here.)**

- 2) Make a prediction: *What will happen to the cost if the per-minute charge decreases to \$0.05? How will that change appear on the graph?* Write down your prediction below. Then select the values from the picklists and see what happens.

**(Your own prediction goes here.)**

- 3) Set the values at the default setting (\$5, \$0.10). Make a prediction: *What will happen to the cost if the basic fee per month decreases to \$0? To \$2? How will those changes appear on the graph?* Write down your predictions below. Then select the values from the picklists and see what happens.

**(Your own prediction goes here.)**

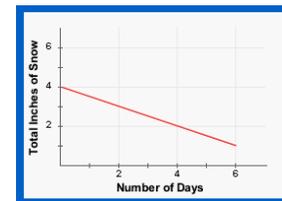
- 4) In general, what effect does a change in the basic fee make to the graph and to the values in the table?

**It affects the y-intercept and the starting cost at 0 minutes.**

- 5) In general, what effect does a change in the per-minute charge make to the graph and to the values in the table?

**It affects the slope of the line and by how much the cost increases for each 10-minute block of time.**

Now click on the right arrow to move to Situation #2. Notice in Situation 2 that the line is tilted down from left to right (this is called a “negative slope.”)



6) Why does the line have a negative slope in this situation? Write your answer below.

**Because as the number of days increases, the total inches of snow decreases.**

7) The default situation indicates that it snowed 4 inches and is melting at an average rate of  $-0.50$  inches per day. Make a prediction: *What will happen to the total amount of snow left if the starting amount of snow increases?* Write down your prediction below. Then select a value larger than 4 inches and see what happens.

**(Your prediction goes here.)**

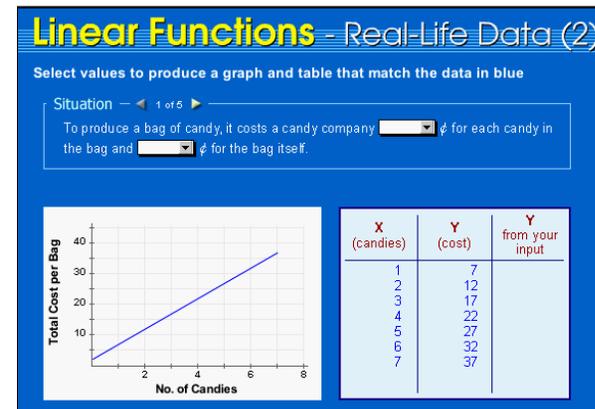
8) Set the values at the default setting (4,  $-0.5$ ). Make a prediction: What will happen to the total amount of snow left if the average rate of melting increases? How will those changes appear on the graph? Write down your predictions below. Then select the values from the picklists and see what happens.

**(Your prediction goes here.)**

## Real-Life Data, Part 2

### Read Before Starting:

- In Part 1, you were given a default situation and you changed the situation to see what the results were to the table and the graph. Now in Part 2, you are given a table and a graph and you have to identify the correct situation that produces those values and the graph. Part 2 is similar to Part 1 with one important exception: a line appears on the graph, but you are given no default values in the picklists.



- As you work through this applet, try to develop a way to predict the values for the situation based on the information in the table and the graph.
- **You will select values from the picklists to produce results that match the information in the table and on the graph.** The line that appears from the values you've selected will appear in red on the graph. When you select the appropriate values to reproduce the graph and table, you will see the word "Correct" appear in yellow above the graph. In addition, values will appear in the table in the right-most column in red.
- The amount of tilt that a line has is called its "**slope**." For any given line, one can measure the amount of vertical change and the amount of horizontal change between any two points on the line. The amount of vertical change divided by the amount of horizontal change produces a ratio that is called the "slope" and can be calculated for any given line. In Session 4, you will learn more about slope and how it is calculated.
- The place where the line crosses the y-axis is called the "**y-intercept**." It is expressed as a single number that is the y coordinate of the point.

**To Do:**

For each situation 1-5,

- read the situation carefully and first think about how the different values in the situation might affect the graph and table of values.
- select values in the picklist that make the line graphs match and that make the columns of y values be identical.

Your goal at the end of this applet is to be able to look at a line graph and a table of values and predict the values in the situation that will produce those results. Part 3 will give you a chance to test your abilities to do this without picklists of choices.

After you have worked through the five situations, answer the following questions:

- 1) What generalizations can you make about how the values in the situation determine the slope of the line?

**The values that determine the rate of change for each problem affect the slope of the line.**

**or**

**(In more student-oriented language): The values that have to do with the amount that changes according to a certain number of things (dollars per hour, dollars per month, yards of ribbon per student, etc.) in each problem will determine the slope. The number that does not change, no matter what happens in the situation, does not affect the slope.**

**This is because there is a rate in each situation, and that rate at which things change is represented by the slope of the line.**

- 2) What generalizations can you make about how the values in the situation determine the location of the y-intercept?

**The number that is fixed (unchanging) in each situation determines the location of the y-intercept. This is because the fixed amount is part of the total even when the x-values equal 0.**

## Real-Life Data, Part 3

### Read Before Starting:

- As in Part 2, you are given a table and a graph and must identify the correct situation that produces those values and the graph. However, you are given no picklists. Use your learning from Parts 1 and 2 to help you determine the missing values in the situation.
- As in Part 2, when you select the appropriate values to reproduce the graph and table, you will see the word “Correct appear in yellow above the graph.

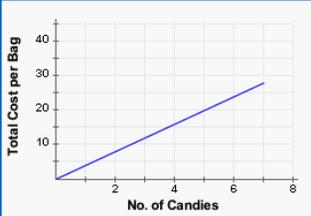
**Linear Functions** – Real-Life Data (3)

Type in values to produce a graph and table that match the data in blue

Situation 1 of 5

To produce a bag of candy, it costs a candy company ? ¢ for each candy in the bag and ? ¢ for the bag itself.

$y = ? x + ?$  **Go**



X (candies)	Y (cost)	Y from your input
1	4	
2	8	
3	12	
4	16	
5	20	
6	24	
7	28	

### To Do:

For each situation 1-5,

- read the situation carefully and first think about how the different values in the situation might affect the graph and table of values.
- type in values that make the line graphs match and that make the columns of y values be identical.