**Problem of the Week #3**

**Patterns: Marcella’s Bagels**

Marcella was walking home from the beach one day. She had just bought a big bag of bagels and was going to share them with her daughter Sonya. (Sonya loves bagels.)

On the side of the road she saw two people collecting food for needy families. Well, Marcella decided that she had quite a few bagels in her bag. Sonya didn’t need that many bagels.

“Here,” said Marcella, “you can have half of my bagels for the needy.” The people were very happy to get all of those bagels. Marcella thought for a moment and then said, “Aw, take one for each of yourselves.” So there went two more.

As Marcella walked along the beach, some surfers came out of the water. They saw, and even smelled, the fresh bagels she had. “Could you by any chance spare a few bagels?” they pleaded. “We are so-o-o hungry after riding all of those gnarly waves.”

As you might imagine, Marcella was not thrilled. But she had a good heart and recognized hunger after physical exertion, so she handed her bag to the surfers. They took half of her bagels and then, just as they were about to hand the bag back, they took two more.

Now Marcella was a very reasonable person who liked to help others. She thought she still had enough bagels left to make Sonya happy. She walked on.

As you may already have guessed, Marcella didn’t get far before she had another encounter. Just before she reached home, her friend Susan approached. After exchanging greetings, Susan explained that she was on her way to get some bagels for her family. Susan seemed to be in a bit of a rush.

Generosity overtook Marcella and she found herself saying, “Why don’t you save yourself that trip and take some of my bagels? As you can see, I’ve got several.” So Susan took half of what Marcella had in her bag and then two more.

Marcella finished her walk home without further interruption. When she opened her once bulging bag of bagels, she discovered that there were only two left! She had a bagel lunch with her daughter Sonya, and then there were none!

After lunch, Sonya asked her mother how many bagels had been in the bag to begin with. Marcella told her the story of her walk and then said that is Sonya could figure it out herself, Marcella would take her rollerblading in the park the next day.

Sonya took a while, but she figured it out and got her rollerblading outing.

What was Sonya’s answer?

**Sections to include in write up (refer to #1 and #2):**

1. Problem Statement
2. Process
3. Solution

**Extension: Marcella’s Bagels**

In this assignment, you will work on an extension to the *Marcella’s Bagels* problem. Your work should give you some ideas about how a table of values can be used to gain insight into a problem situation.

Here’s the extension for you to work on:

 *How does the solution to Marcella’s Bagels depend on the number of bagels she has when she gets home?*

In order to explore this extension, try different values for the number she has when get gets home, like 3, 4, 5, or even 0. You should assume that everything in the problem is the same as in the original problem except for this number.

Make an input/output table of your results. That is, make a table in which the input is the number of bagels she has when she gets home and the output is the number she must have started with. (You already know that the output is 44 when the input is 2.)

Once you have several entries for this table, look for a relationship between the output and input, and then try to find a rule to describe this relationship. You may find it helpful to look for a pattern within the output column.

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