Math Diversion Problem 656

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> Learning is a treasure that will follow its owner everywhere.
> — Chinese proverb

The problem is found at:

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Source: Finite Mathematics, 5th Ed. Brooks/Cole
      (2002), p. 57
Title: A Mixed-rate problem
 Presenter:  H. Rolf
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1 The Problem

A woman must control her diet. She selects milk and bagel for breakfast. How much of each should she serve in order to consume 700 calories and 28 grams of protein? Each cup of milk contains 170 calories and 8 grams of protein. Each bagel contains 138 calories and 4 grams of protein.

SOLUTION:

Conceptualizing the problem

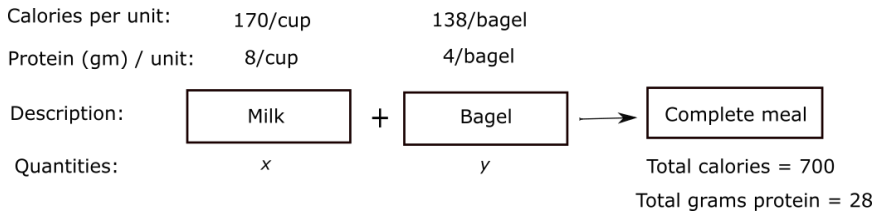

Figure 1. As usual, rates are placed above and quantities (and totals) are placed below. (Units: x is in cups and y is in whole bagels.)

We simply have two totals to deal with, employing the given constraints on the amounts of each. Referencing Figure 1, we have that (balancing first for calories

and then for protein)

$$170x + 138y = 700\,, \tag{1a}$$
$$8x + 4y = 28\,, \tag{1b}$$

which has solution

$$x = \frac{133}{53} \approx 2.5 \quad \text{and} \quad y = \frac{105}{53} \approx 2\,. \tag{2}$$

That is, the meal is to consist of 2.5 cups of milk and 2 bagels.