**The Farmer’s Market Problem**

At a local farmer’s market, three purchases were made for the prices shown in the figure below involving cantaloupes, flowers, and watermelon. What is the cost of each object? Explain your reasoning.



Source: Billstein, R., Libeskind, S., & Lott. J. (2010). *A Problem Solving Approach to Mathematics for Elementary School Teachers* (10th
 edition). Boston, MA: Pearson/Addison Wesley.

**The Farmer’s Market Problem Key**:
Combine the (b) and (c) objects which have a total value of $16. Take away the (a) objects for a value of $8 for the two watermelons. Then, each watermelon must cost $4. Once we know that, we use (b) to find the flower to be worth $5 and then use (a) to find the cantaloupe to be worth $3.

Using equations, we have 2W + F + C = 16 from combining the (b) and (c) objects. Then substituting F + C = 8 into that equation, we have 2W + 8 = 16. Then, 2W = 8 and W = 4. Since W + F = 9, we have 4 + F = 9 leading to F = 5. Since C + F = 8, we have C + 5 = 8 leading to C = 3.

**Rationale for The Farmer’s Market Problem**

Anticipated students:
 This can be a trial and error addition problem (suggested Grades 1-2), but can also challenge a middle school student solving linear systems. As the items and prices change to larger numbers, this becomes an upper elementary, middle, or even high school-level problem. This task could certainly be tried in earlier grades but may be particularly suitable to Grade 4 students. MGSE4.OA3 Solve multistep word problems with whole numbers and having whole number answers using the four operations, …. Represent these problems using equations with a symbol or letter standing for the unknown quantity.

 Goals for student learning:
 Solving a problem involving pricing of three items with three collections of clues (involving three linear
 equations)

 Mathematical features of the task:
 Addition of whole numbers, fact families; Depending on the chosen strategy, solving a linear equation
 with substitution and the addition and multiplication principles.

 Level of cognitive demands:
 Cognitively high; Doing mathematics in the sense that there is no clear pathway. There are several
 strategy options. The directions ask for an explanation. The problem itself can be characterized as a linear
 system with three equations and three unknowns, but is still quite accessible to younger minds!

 Rationale for the categorization of cognitive demands:
 According to Stein and Smith (1998), “doing mathematics” tasks require complex and nonalgorithmic
 thinking. Especially considering this problem involves pricing in the context of a linear system with three
 equations and three unknowns, this is a very open-ended, complex algebraic thinking task.