Math Diversion Problem 753

P. Reany

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> It's surprising that a philosophical assumption has
> mathematical consequences which can
> be tested experimentally.
> — Jed Brody
> (Quantum Entanglement)

The material here is found at:

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Source: The Ether of Great Mathematical Ideas
Title: Word problem, mixed rate
 Presenter: Patrick
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1 The Problem

A woman sold 100 oranges for \$12.10 total. She sold the first kind at the rate of 3 for 35¢ and the second kind at the rate of 7 for 85¢. How many were sold at the first rate?

2 The Solution

Let's begin with a figure this time.

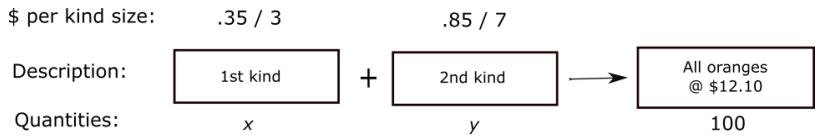

Figure 1. We've converted the cents sign to dollars. Otherwise, the problem is quite familiar to us by now.

Next, we write the familiar 'total as sum of its parts' equation:

$$\text{(Total sales from oranges)} = \text{(sales from 1st kind)} + \text{(sales from 2nd kind)}\,. \tag{1}$$

Then, suppressing units, we get

$$12.10 = \frac{.35}{3}\, x + \frac{.85}{7}\, y\,. \tag{2a}$$

We also have the conservation equation on the total number of oranges:

$$100 = x + y\,. \tag{2b}$$

Combining (2a) and (2b), we get the solution for the first kind sold as $x = 9$ oranges.