

Math Diversion Problem 597

P. Reany

May 21, 2025

I love it when a plan comes together.

— Hannibal Smith, *The A-Team*

1 The Problem

A merchant has 100 lbs of sugar, part of which (x lbs) he sells at 7% profit and the rest (y lbs) at 17% profit. The division of the whole into two parts is to be made so that the net profit is the same as 10% on each original quantity of sugar. How much is each part?

2 The Solution

Let's begin with a figure to help us conceptualize the data.

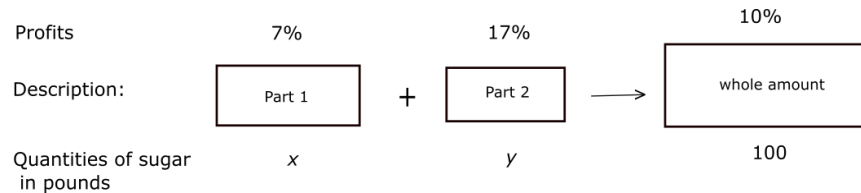


Figure 2. How to divide 100 pounds of sugar to get 10% profit.

So, we have two equations in two unknowns, beginning with the conservation of weight of sugar (in pounds):

$$x + y = 100. \quad (1)$$

And we have the conservation of profit:

$$(\text{profit off of } x) + (\text{profit off of } y) = (\text{net profit off of 100 lbs}). \quad (2)$$

For the next refinement, we'll convert percentages to decimals and multiply rates times quantities off Figure 2, to get

$$.07x + .17y = .10 \cdot 100 = 10.00. \quad (3)$$

Solving (1) and (3) together yields $x = 70$ and $y = 30$ in pounds.