Math Diversion 992

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Every big idea needs someone to defend it.
— Cybersecurity

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Source: https://www.algebra.com/algebra
Title: Question 255570: A Mixed-Rate Problem
 Presenter: Patrick
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1 Problem

It is required to make 12 grams of certain chemical compound called Z. This is made from compounds W, X, and Y in the ratio of 2:1:3. The compound Y is itself made from W and X. To make 6 grams of Y requires 4 grams of W and 2 grams of X. How much W and X is required to make the required amount of Z.

2 Solution

We need to make 12gm of compound Z using W,X,Y in ratios 2:1:3. Taking the total as the sum of its parts, we write

$$2t + t + 3t = 12\,. \tag{1}$$

From this we get

$$t = 2[\text{grams}]\,. \tag{2}$$

Let's make a figure from this.

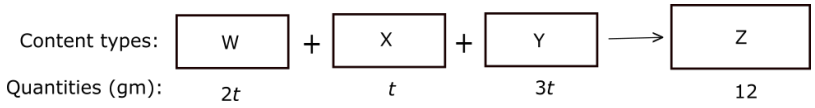

Figure 1. The quantities of W, X, and Y have been chosen to enforce the ratios 2:1:3.

And from this we know that there are 6 grams of Y. But we are given that 6 grams of Y contains 4 grams of W and 2 grams of X. So, we add these quantities to the W and X in the figure, to get $2t + 4$ for W and $t + 2$ for X. Therefore,

$$W = 8[\text{grams}]\,, \quad X = 4[\text{grams}]\,. \tag{3}$$