Math Diversion 1078

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We must use time as a tool, not as a couch.
— John F. Kennedy

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Source:  https://answers.yahoo.com/question/
    index?qid=20080214222603AAcQyvt
Title: A Mixed-Rate Problem
 Presenter: Patrick
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1 Problem

An employer has a daily payroll of $1950 when employing some workers at $120 per day [type B worker] and others at $150 per day [type A worker]. When the number of $120 workers is increased by 50% and the number of $150 workers is decreased by 1/5, the new daily payroll is $2,400. Find how many workers were originally employed at each rate.

2 Solution

This is a fairly simple mixed-rate problem. Let's start with a figure.

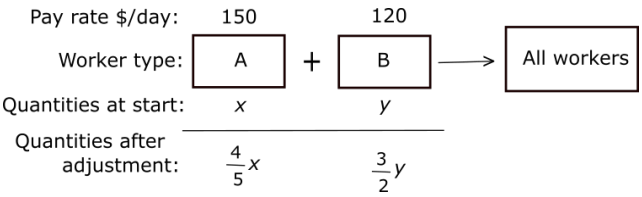

Figure 3. Standard mixed-rate problem. To increase by 50% is to multiply by 3/2. To decrease by a 1/5th is to leave 4/5th.

For each configuration of workers, we have a distinct 'total as the sum of its parts' to write down:

$$150x + 120y = 1950\,, \tag{1a}$$

and

$$150(\tfrac{4}{5}x) + 120(\tfrac{3}{2}y) = 2400\,. \tag{1b}$$

The solution to this system is $x = 5$ and $y = 10$.