Math Diversion Problem 890

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November 8, 2025

No mystery is closed to an open mind.
—Tim White
Sightings TV show

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Source:  https://answers.yahoo.com/question/index?qid=
    20080309104615AAMKboY
Title: Hard algebra word problems?
 Presenter:  Patrick
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1 Problem

Hockey teams receive 2 points when they win and 1 point when they tie. One season, a team won a championship with 56 points. They won 10 more games than they tied. How many wins and how many ties did the team have?

2 Solution

This is almost a 'standard' mixed-rate problem. In a standard mixed-rate problem, all necessary information is presented either as invariants in a before-and-after process or as relations between totals and their parts. In a nonstandard mixed-rate problem, some necessary information is given in some other form. I refer to that other form as *constitutive*, meaning that it constitutes an essential part of the system that is to be solved, but is given in nonstandard form. However, I don't want to give the impression that constitutive information is inferior. The only reason I justify referring to a class of mixed-rate problems as 'standard' is only due to the prevalence of the form I find them in.

Let W be the number of wins and T be the number of ties.

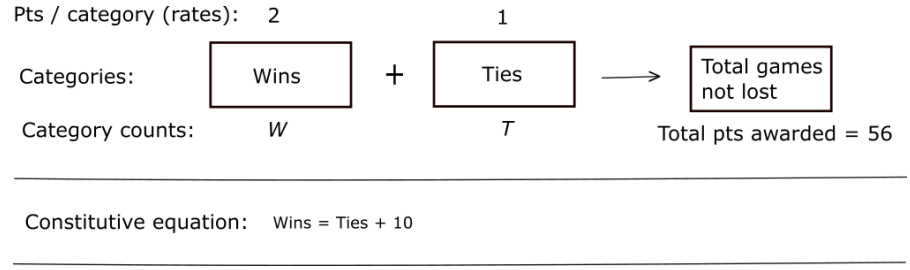

Figure 1. Standard and nonstandard information given to us.

The standard information given to us is in the form of a total equal to the sum of its parts:

$$(2)W + (1)T = 56\,. \tag{1a}$$

We were also given the constitutive relation

$$W = T + 10\,. \tag{1b}$$

These equations have the solution $T = 12$ and $W = 22$.