

## PERCENT IN A NUTSHELL ... \*

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### ABSTRACT

Ironically, the “learning of percent” is one of the most problematic aspects of school mathematics.

In our view, these difficulties are not associated with the arithmetic aspects of the “percent problems”, but mostly with two methodological issues: firstly, providing students with a simple and accurate understanding of the rationale behind the use of percent, and secondly - overcoming the psychological complexities of the fluent and comprehensive understanding by the students of the sometimes specific wordings of “percent problems”.

Before we talk about percent, it is necessary to acquaint students with a much more fundamental and important (regrettably, not covered by the school syllabus) classical concepts of quantitative and qualitative comparison of values, to give students the opportunity to learn the relevant standard terminology and become accustomed to conventional turns of speech.

Further, it makes sense to briefly touch on the issue (important in its own right) of different representations of numbers.

Percent is just one of the technical, but common forms of data representation:

$$p\% = p \times \% = p \times 0.01 = p \times 1/100 = p/100 = p \times 10^{-2}$$

“Percent problems” are involved in just two cases:

- I. The ratio of a variation **m** to the standard **M**
- II. The relative deviation of a variation **m** from the standard **M**

The hardest and most essential in each specific “percent problem” is not the routine arithmetic actions involved, but the ability to figure out, to clearly understand which of the variables involved in the problem instructions is the standard and which is the variation. And in the first place, this is what teachers need to patiently and persistently teach their students.

As a matter of fact, most primary school pupils are not yet quite ready for the lexical specificity of “percent problems”. ....Math teachers should closely, hand in

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\* The full text of the article is available in Russian on-line at the website of the conference <http://remia2010.fmi-plovdiv.org/papers/rozov.pdf>

hand with their students, carry out a linguistic analysis of the wording of each problem ...

Schoolchildren must firmly understand that a comparison of objects is only meaningful when we speak about properties which can be objectively expressed in terms of actual numerical characteristics.

In our opinion, an adequate acquisition of the teaching unit on percent cannot be achieved in primary school due to objective psychological specificities related to this age and because of the level of general training of students. Yet, if we want to make this topic truly accessible and practically useful, it should be taught in high school.

*A final question to the reader (quickly, please): What is greater:  $\pi\%$  of  $e$  or  $e\%$  of  $\pi$ ?*

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