



Number theory vs. Hungarian highschool textbooks: $\sqrt{2}$ is irrational

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Abstract.

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1. Introduction

This paper is a sequel to [5], where the presentation of basic notions of number theory in Hungarian textbooks, like fundamental theorem of arithmetic, greatest common divisor (gcd), least common multiple were analyzed. In this paper we investigate into the proofs concerning number theory appearing in highschool textbooks. The almost obligatory one is the proof of the irrationality of $\sqrt{2}$. The number $\sqrt{2}$ exists and irrational. In the inaugural issue of this journal a paper was published about the existence of $\sqrt{2}$ [7]. In this paper we make a point that although $\sqrt{2}$ is irrational, the proof of this fact is not appropriate to introduce the notion of proof in highschool or at least not the proof that is presented in most books. Most people when asked about the proof of the irrationality of $\sqrt{2}$ start by saying “we prove by way of contradiction”. We will argue that the first sentence should be: “The proof is based on the fundamental theorem of arithmetic (FTA)”. The role of this proof is multipurpose. This is not only one of the few proofs covered in highschool, but also the first place where pupils meet with irrational numbers and the first time when they meet the strategy of proving