

Épreuve de section européenne

1 General knowledge

What is a proof by contradiction? Prove that there is no smallest positive rational number. What other examples of such proofs do you know?

2 Document

For modern man it is impossible to conceive of a world without numbers. If we were unable to distinguish between 1 and 2, between 10 and 12, between one thousand and one million, our whole culture and civilization would collapse. No policeman could stop us for passing the speed limit, for this limit must be fixed in terms of numbers, provided of course that it would be possible to build automobiles without being able to count the number of wheels or doors to be built into them. Whatever we think about in our daily life and surroundings is in one way or another dependent on our ability to count. In this sense, if in no other, certainly the old Pythagorean saying is true : “All is number.”

Considering for a moment the number system in common use today, probably the most remarkable fact about it is that the whole of civilized mankind, with very few exceptions, is using the same kind of system and symbols. Though we speak many languages and write in different scripts, the number of different number systems still in use today all over our planet is far more limited. And for all scientific work there is in fact only one system – the one Westerners have all known since their childhood. Consisting of ten symbols 1, 2, 3, 4, 5, 6, 7, 8, 9 and 0, it is so highly developed that all other numbers are expressible by means of these two handfuls of signs. A remarkable achievement, if one stops to think about it for a moment.

From the *Dictionary of the history of ideas*, by Christoph J. Scriba.

3 Questions

1. How does the writer illustrate the importance of numbers in our society?
2. Where does the saying “All is number” come from?
3. Explain why we can say that numbers are a universal language.
4. Give at least two number systems different from the decimal system.
5. Explain how, in our decimal system, only ten symbols are enough to represent any number.