Summary: This first article of a series of two presents on teaching elementary algebra different standpoints, not always easy to reconcile with each other; a second article will cover activities to promote the learning of algebra. The expectations expressed by the institution on this learning are determined by the common uses of algebra in everyday or professional life, such as the introduction and use of formulas in a spreadsheet. But the results observed at the end of compulsory schooling are clearly insufficient. From a cognitive standpoint, the phased curriculum of algebra does not appear satisfactory, especially not taking into account the difference between symbolic writing and the natural language. The historical view shows, before the use of algebraic notation, the use of algorithmic processes significantly more advanced than the beginnings of algebra, so difficult to transpose in education; but it also points out that following the invention of printing, writing algebraic and relative numbers have arisen simultaneously, which deserves consideration for teaching algebra. Our analysis of the treatment required by algebraic problem solving first highlights the role of the functional designation, next to the direct designation, and the crucial importance of a commonly misunderstood operation, namely that of renaming considered objects. Then arose the fundamental semiotic distinction for analyzing the specific cognitive functioning for processing complete expressions in algebra, namely between a sign and its occurrences.

Classification: E40 H20
Keywords: elementary algebra; algebraic notations; algebraic expressions