Algebraic Methods

Algebra: the word was derived from the title of Al-Khwarizmi's book (written in Baghdad ca. 820 A.D.), "Hisab al-jabr w'al-muqabala" which means (roughly) "Calculation by restoration and reduction".
– book was later called "Al-Khwarizmi's Algebra".

al-jabr (= restoration): add equal terms to both sides of an equation (to eliminate negative terms)

al-muqabala (= reduction): subtract equal terms to both sides of an equation (to simplify it).

Due to the popularity of Al-Khwarizmi's book, the term algebra came to mean:

Algebra = "art of reducing and solving equations".

Note: From the very beginning, algebra (and mathematics in general) was considered to be a great art:

Omar Khayyam (1080): The Art of Algebra.

Cardano (1545): Ars Magna (= The Great Art).

In this course we'll study various methods to solve equations in many different number systems.

Method: from the Greek word *méthodos* = a way or path of an investigation according to fixed rules (*hódos* = way).

– usually: systematic procedure (for solving a problem). Thus, the term is closely related to:

Algorithm: The description of a (finite) procedure (usually: suitable for programming on a computer).

– derived from Al-Khwarizmi's name, and is closely connected with the advent of the so-called Arabic numerals (and the decimal notation) in Europe.

– due to the fact that Al-Khwarizmi wrote a book on Indian numerals called

Algorithmi de numero indorum

(Calculation with Indian numerals)

in its Latin translation (the original Arabic version no longer exists).

Note: Algorism means decimal notation.