

The History of Algebra

Algebra = the “art of solving equations”.

Babylonians (ca. 1900 BC): knew how to solve **linear** and **quadratic** equations:

$$(1) \quad ax + b = c \quad \text{and} \quad x^2 + bx = c, \quad x^2 + c = bx$$

Al-Kwarizmi (ca. 820 AD): wrote the text “Al-jabr...”, a manual for solving the equations of type (1).

Scipione de Ferro (ca. 1505): found a method for solving the **special cubic** equation $x^3 + mx = n$.

Tartaglia (1535, 1541): was able to solve the **general cubic**

$$ax^3 + bx^2 + cx + d = 0.$$

Ferrari (ca. 1540): adapted Tartaglia’s method to solve **quartic** equations:

$$ax^4 + bx^3 + cx^2 + dx + e = 0.$$

Cardano (1545): in his treatise *Ars magna* (= the Great Art), he presented the method of solving **cubics** which he learned (and stole) from Tartaglia.

Ruffini, Abel, Galois (ca. 1800): proved that if $n \geq 5$, there cannot exist a *general formula* for solving a **polynomial equation** of degree n :

$$x^n + a_{n-1}x^{n-1} + \dots + a_1x + a_0 = 0.$$