POLYNOMIAL EQUATIONS

The Abel–Ruffini Theorem

A hard boundary at degree five.

THE THEOREM SAYS

No general formula built from radicals and arithmetic can solve every polynomial equation of degree five or higher.

IT DOES NOT SAY

~~Equations of degree five or higher cannot be solved.~~

READING "NO GENERAL FORMULA" AS "NO SOLUTION"

WRONG WORKING

The equation is a quintic, so its roots cannot be found.

RIGHT WORKING

Specific equations may still yield to factoring, the rational root theorem or substitution tricks; each confirmed root lowers the degree by one, and numerical methods approximate the rest to any accuracy.

Below degree five: closed forms exist, Cardano's formula for cubics and Ferrari's method for quartics, cumbersome and rarely used. The Fundamental Theorem of Algebra still guarantees exactly n complex roots.