Quartic Equations Encyclopedia Article

Quartic Equations

The following sections of this BookRags Literature Study Guide is offprint from Gale's For Students Series: Presenting Analysis, Context, and Criticism on Commonly Studied Works: Introduction, Author Biography, Plot Summary, Characters, Themes, Style, Historical Context, Critical Overview, Criticism and Critical Essays, Media Adaptations, Topics for Further Study, Compare & Contrast, What Do I Read Next?, For Further Study, and Sources.

(c)1998-2002; (c)2002 by Gale. Gale is an imprint of The Gale Group, Inc., a division of Thomson Learning, Inc. Gale and Design and Thomson Learning are trademarks used herein under license.

The following sections, if they exist, are offprint from Beacham's Encyclopedia of Popular Fiction: "Social Concerns", "Thematic Overview", "Techniques", "Literary Precedents", "Key Questions", "Related Titles", "Adaptations", "Related Web Sites". (c)1994-2005, by Walton Beacham.

The following sections, if they exist, are offprint from Beacham's Guide to Literature for Young Adults: "About the Author", "Overview", "Setting", "Literary Qualities", "Social Sensitivity", "Topics for Discussion", "Ideas for Reports and Papers". (c)1994-2005, by Walton Beacham.

All other sections in this Literature Study Guide are owned and copyrighted by BookRags, Inc.



Contents

Quartic Equations Encyclopedia Article.....1

Contents.....2

Quartic Equations.....3

Quartic Equations

Quartic **equations** are polynomial equations with one unknown **variable** (usually denoted by x), which is never raised to a power greater than 4. Symbolically, they can always be written as follows: $ax^4 + bx^3 + cx^2 + dx + e = 0$, where a, b, c, d, and e are numbers. The problem of solving polynomial equations in general, and quartic equations in particular, has been a central theme in **algebra** from antiquity to the present.

For much of this period, the interest in such problems was purely theoretical. Nowadays, polynomial equations have practical significance as well. To position the end of a robot arm correctly to screw in a bolt, for instance, the robot (or its programmer) **sets** up a system of polynomial equations. The solution to this system tells the robot what **angle** at each joint will cause the end of the arm to end up in the desired location. In essence, the robot uses mathematics to replace the senses of sight and touch.

Quadratic equations were solved by the ancient Babylonians, but mathematicians did not master **cubic equations** until 1545, when the Italian mathematician **Girolamo Cardano** published the first method for solving them. One might have expected quartic equations to be even harder, but in fact they were conquered at the same time. In remarkably offhand fashion, Cardano attributed the method to his student Luigi Ferrari, "who invented it at my request."

Though the computations can be backbreaking to do by hand, the solution method can be broken down into a simple sequence of steps that are easily programmed into a computer. Even so, the solution to a quartic equation typically requires many lines of type, and involves **square roots** inside of cube roots inside of square roots. Sadly, Ferrari's ingenious method is almost useless for practical purposes. Nevertheless, its discovery demonstrated the power of algebra, and prepared the way for a shocking discovery over 250 years later: the unsolvability of **quintic equations**.