Gelfond-Schneider Theorem Encyclopedia Article

Gelfond-Schneider Theorem

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.



BOOKRAGS

Contents

Gelfond-Schneider Theorem Encyclopedia Article.....1

Contents.....2

Gelfond-Schneider Theorem.....3

Gelfond-Schneider Theorem

The Gelfond-Schneider **theorem** states that if a and b are **algebraic numbers**, a is not **zero** or one, and b is irrational then a^b is a transcendental number. For example, the theorem guarantees that 2^2 is transcendental by applying the result with a=2 and b = 2, which is irrational. It also guarantees that, for example, the base 10 logarithm of 2 is transcendental.

The statement of the Gelfond-Schneider theorem was posed as the seventh problem of D. Hilbert's famous list of 23 problems. Hilbert is reputed to have said that he did not expect this problem to be solved in his lifetime. Contrary to his expectations, the theorem was proved independently by the Russian mathematician **Aleksandr Osipovich Gelfond** and the German mathematician Theodor Schneider in 1934. Their work is a vast extension of the work of C. Hermite and F. Lindemann who, in the 19th century, proved the transcendence of the numbers e and , respectively. The work of Gelfond and Schneider was further developed into modern transcendence theory by many authors, notably the British mathematician A. Baker who proved a conjecture of Gelfond on linear combinations with algebraic coefficients of **logarithms** of algebraic numbers, for which he received the Fields medal in 1966.