

## Diophantus

3rd Century CE.



Not a lot is known about Diophantus. Some say that his life was anywhere between 250 to 350 CE. Scholars do not agree about his origins. Some say he was Greek; others say he was Hellenized Egyptian, Hellenized Babylonian, Jewish or Chaldean.

While not much is known, here are the essential facts that we know about Diophantus of Alexandria pertaining to Algebra.

- Diophantus is thought, by many, to be the Father of Algebra.
- He wrote *Arithmetica*- a collection of problems with both determinate and indeterminate solutions.
  - It is noted that Diophantus did not use general methods for solving his problems. Each problem called for a unique method that would refuse to work in any other case. It is said that a modern scholar would not be able to solve his 101st problem after studying his first 100 problems.
  - Most of the problems in the book lead to quadratic equations.
  - Diophantus looked at three forms of a quadratic equation. He used three forms for two reasons. One, Diophantus did not have a notation for zero and, two, he ignored any negative coefficients by considering  $a$ ,  $b$ , and  $c$  to be positive in each of the three cases (he considered negative numbers to be useless and absurd).

■  $ax^2 + bx = c$

■  $ax^2 = bx + c$

■  $ax^2 + c = bx$

- Diophantine equations are polynomials with integer coefficients to which only integer solutions are sought.
- He was known to only accept positive rational answers
- Diophantus was the first to use algebraic notation and symbolism.
  - He used abridged symbolism for frequently used operations.

MODERN	DIOPHANTUS
unknown	$S'$ or $S''$
$X^2$	$S^{\frac{1}{2}}$
$X^3$	$K^{\frac{1}{3}}$
$X^4$	$SS^{\frac{1}{4}}$
$X^5$	$SK^{\frac{1}{5}}$
$X^6$	$KK^{\frac{1}{6}}$
minus	$\uparrow$
equality	$\epsilon$

**Resources:**

Wikipedia, November 18, 2018, *Diophantus*

<https://en.wikipedia.org/wiki/Diophantus>

Kirschenbaum, M, 2000, *Alexandrian Algebra According to Diophantus*

<http://sites.math.rutgers.edu/courses/436/436-s00/Papers2000/kirschm.html>

New World Encyclopedia, October 2017, *Diophantus*

<http://www.newworldencyclopedia.org/entry/Diophantus>