

The Cossic Art

Erica Freehoff
&
Audrey O'Keefe

Starting off

- Algebra: (n.) the branch of mathematics that deals with general statements of relations, utilizing letters and other symbols to represent specific sets of numbers, values, vectors, etc., in the description of such relations.
- History of "The Cossic Art"
 - "shai" Al-Khwarizmi's
 - "causa" Latin Translation
 - "cosa" Italian Translation
 - "coss" German Translation
 - "The Cossic Art" "The Art of Things"

Rhetorical Algebra

- Used in the 13th and 14th century
 - $X^3 - 5x^2 + 7x = \text{sqrt}(x+6)$ became
“The cube and seven things less five squares is equal to the root of six more then the thing.”
- Beginning of symbolic algebra
 - ‘p’, ‘~p’, ‘-p’ for plus
 - ‘m’, ‘~m’, ‘-m’ for minus

Start of Symbols

- Late 15th Century begins
 - Leonardo of Pisa began to use 'R' for square root
- “symbols” of this time were more like abbreviations
- Luca Pacioli “*Summa de Arithmetica*” 1494
 - cu. ~m.5.ce.~p.7.co.—Rv.co.~p.6
 - co – “cosa”
 - ce – “censa”
 - cu – “cubo”

Modern Symbols begin

- 16th Century Germany
 - "+" and "-" appear
 - "surd" symbol appears
 - Equal was abbreviated with either Latin or German word
 - Terms grouped by dots
 - Ex: Christoff Rudolff's *Coss* of 1525, or Michael Stifel's *Aritmetica Integra* of 1544

$$c - 5z + 7z \text{ aequ. } \sqrt{\cdot} z + 6.$$

First Look at Exponents

1^3 . \sim m. 5^2 . \sim p. 7^1 .montent \mathfrak{R}^2 . 1^1 . $p.6^0$.

- “powers of the unknown had distinct, unrelated symbols” in Italian notation
- Nicholas Chuquet, 1484, used superscript numbers above the coefficients
 - Chuquet’s work unknown because it was never published
- Superscript reappeared 1572 from Rafael Bombelli
- Picked up in the 1580’s by Simon Stevin who used circles around the exponents
 - 17th century, some of his work was translated into English

A, E, I, O, U

- End of the 16th century, Francois Viète focuses on methods of solving algebraic equations
- Suggests using vowels to represent unknown variables and consonants for the known ones
- Allowed him to write general forms of equations
- Use of Hindu-Arabic numerals

More on Exponents

- Old exponential notation didn't work well with equations containing more than one unknown
- 17th century contained several ideas on what the new notation should be
 - 1620's- Thomas Harriot- $5aaa+7bb$
 - 1634- Pierre Herigone- $5a^3+7b^2$
 - 1636- James Hume- $5a^{iii}+7b^{ii}$
 - 1637- Rene Descartes- $5a^3+7b^2$

Activity

- 10^5 .p. 4^3

- 25^2 .m. 2^9

- 6^5 .m. 3^2 .p. 10^8

- Write these Chuquet equations how

- Harriot

- Herigone

- Hume

- Descartes

would write them.

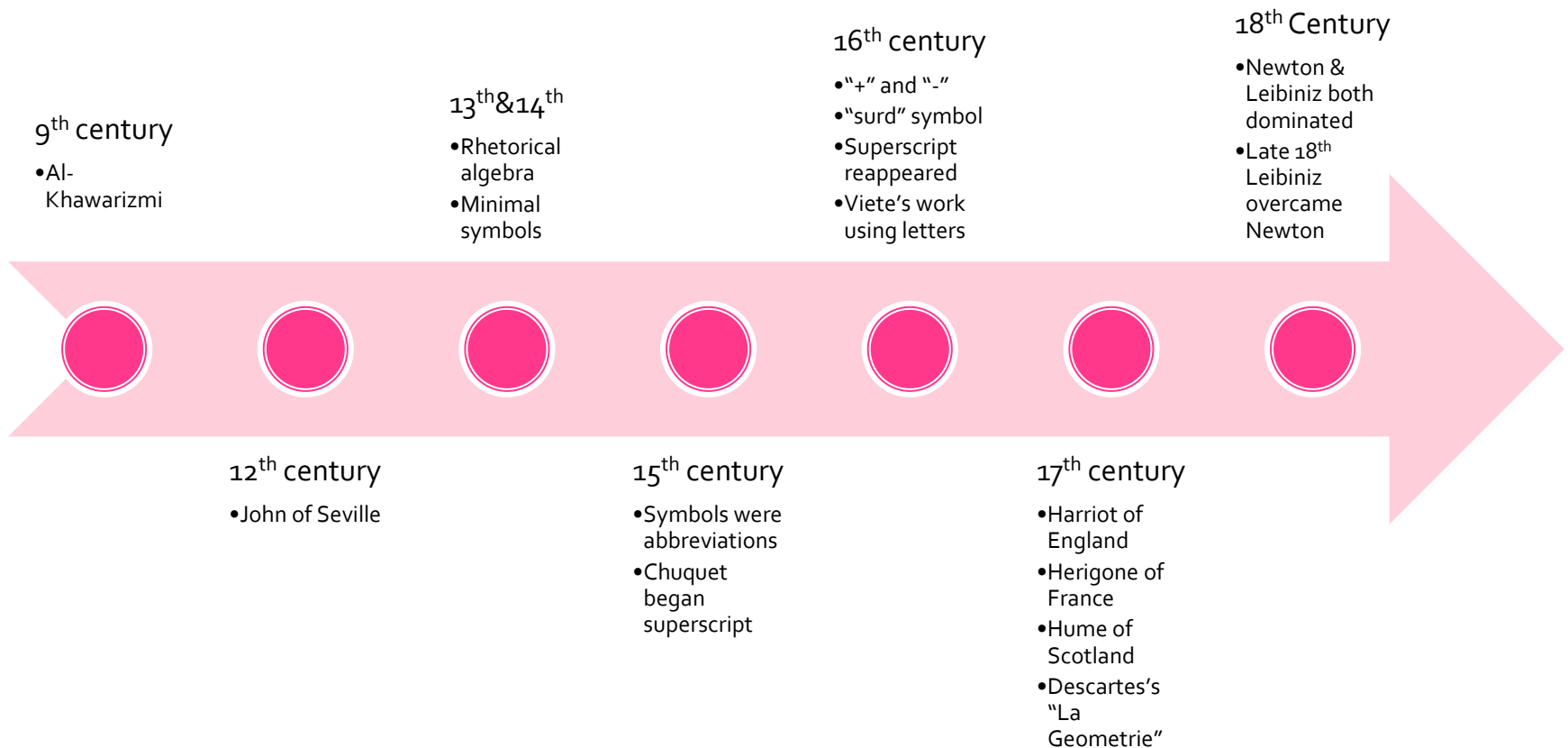
More of Decartes

- Began using letters from the end of the alphabet for unknown and from the beginning for known
- Added an overline bar above the $\sqrt{\quad}$ sign to indicate its scope
- Very close to today's version of the equation

The Equal Sign

- = was proposed by Robert Recorde
- Widely used in England but not popular in the rest of Europe
- Its universal acceptance is largely due to its use by Isaac Newton and Gottfried Leibniz in the late 17th and early 18th century

Time Line



References

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