

## Teaching Mathematics Using History and Fairy Tales

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## Why integrate history and stories into math class?

- To humanize mathematics
- Connect real-life experiences with mathematics
- Show how people in the real world use math
- Relax students and alleviate math anxiety
- Solve problems
- Illustrate concepts by stories

## Mathematicians

Interesting Tidbits

### René Descartes

(March 31, 1596 – February 11, 1650)



Queen Christina



Elizabeth of Bohemia

Blaise Pascal  
(June 19, 1623 –  
August 19, 1662)



Pierre de Fermat  
(August 17, 1601 –  
January 12, 1665)



**Gerolamo Cardano**  
(September 24, 1501  
- September 21,  
1576)



**Niccolo Fontana  
Tartaglia**  
(1499 or 1500 -  
December 13, 1557)



## Robert Recorde

- Ca. 1510-1558
- Introduced = sign



*The Arte*  
 as their lengths was extreme) to divide it only into  
 three parts. Wherof the first is, when the number of  
 equal parts is odd. With the second is, when the num-  
 ber is compared as equal two, and numbers.  
 Whose being you to consider, that you reduce  
 your numbers, to their least denomination, and  
 divide the same, before you make any farther.  
 And again, if your operation be such, that the greater  
 denomination shall be taken to any part of a  
 composite number, you shall knowe it to be, that the  
 number of the greater sign alone, must stand as  
 equal to the other.  
 And thus is all that needeth to be taught, concern-  
 ing this booke.  
 Wherof the radical alteration of equales, I will pre-  
 sente a few examples. Wherof the extraction of their  
 roots, shall be more aptly be taught. And to ex-  
 plaine the true signification of these wordes: is or  
 equalle to. I will firste shew howe the like, a  
 part of parallelles, as a common line of one length,  
 thus: ———, because the 2. theyre, can be made  
 equalle. And so to make their numbers.

1. 14. 2. ——— 11. 2. ——— 7. 1. 2.  
 2. 20. 2. ——— 15. 2. ——— 10. 2. 2.  
 3. 26. 5. ——— 10. 2. ——— 9. 5. ——— 10. 2. ——— 11. 5. 2.  
 4. 19. 2. ——— 19. 2. 2. ——— 10. 5. ——— 10. 2. ——— 19. 2.  
 5. 15. 2. ——— 2. 4. 2. ——— 3. 5. ——— 2. 2. 2.  
 6. 14. 5. ——— 12. 2. ——— 4. 0. 2. ——— 4. 0. 2. ——— 9. 5.  
 In the firste three appeareth, 2. numbers, that is  
 14. 2.

## Christoff Rudolff (1499?-1545?)

- Introduced the radical sign, 1525, in a book called *Die Coss*.
- $\sqrt{\quad}$  Stretched-out  $r$
- Used a vertical bar as a decimal point
- Used a period for equals
- Recognized the law  $b^n \cdot b^m = b^{n+m}$
- Credited with introducing + and -

## Michael Stifel (1486-1567)

- "Greatest German algebraist of the 16<sup>th</sup> century"
- Used + and - signs
- Also credited with modern radical sign
- Concluded world would end on 10/3/1533.
- Said Pope Leo X was the Beast in Rev.
- Magic Squares

## Thomas Hariot (1560-1621)

- Introduced < and > as we use them today
- First to write exponents as we do ( $a^3$  instead of  $aaa$ )
- Helped Sir Walter Raleigh map NC
- Discovered sunspots
- Died of cancer from tobacco



## William Oughtred (1574-1660)

- Introduced the  $\times$  for multiplication
- Introduced  $::$  for proportion and  $\sim$  for difference between
- Clergyman who gave free math lessons
- Famous pupils: John Wallis, Christopher Wren, Seth Ward



## Gottfried Wilhelm von Leibniz (1646-1716)

- Used both  $\bullet$  and  $\cap$  for multiplication
- Calculating machine (first mechanical to multiply and divide)
- Developed binary numeral system



## Johann Heinrich Rann (1622-1676)

- Introduced the  $\div$  symbol for division (although this symbol was used by many continental Europeans for subtraction).

## Christian Kramp (1760-1826)

- First to use the  $n!$  symbol for factorials in 1808
- Used because of printing problems with a previously-used symbol

## Evariste Galois (1811 - 1832)

- "Unfortunately what is little recognized is that the most worthwhile scientific books are those in which the author clearly indicates what he does not know; for an author most hurts his readers by concealing difficulties."
- Died in a duel over a woman's love



## Connecting Real-Life Experiences

## Real World Examples

- Reading blueprints
- Packing furniture
- "Inequalities will never affect me!"
- Emily's inequalities
- Calculator project
- Cartesian inequalities and the tennis court

Relax students and help alleviate math anxiety

Math wasn't created to make students miserable, but to solve problems!

- Religion
  - Pyramids
  - Astronomy
- Politics
  - Sputnik
- Money
  - Geometry and Egyptian taxation

Illustrate a point with a story

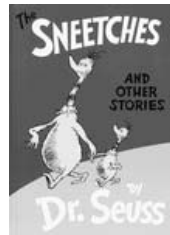
### The Key Story

- Try turning it upside down!
- Factor:  $21x^2 - x - 10$
- $(3x + 5)(7x - 2)$  doesn't work
- Try switching around to
- $(3x + 2)(7x - 5)$



### Dr. Seuss's *The Sneetches*

- Functions



### *The Cat in the Box*

Dana Michel,  
Wonder Books, 1963

- Subsets
- Sets of Numbers



### Trolls and Negative Exponents

- Working with rational expressions with negative exponents such as:

$$\frac{7x^4y^{-6}}{14x^{-2}y^9}$$





## “The Elephant and the Squirrel”

- Children’s story by Bill Sprague from *A Treasury of Bedtime Stories* (ed. Judith Klugmann, Doubleday, 1960).
- Stop and look at other ways of solving problems besides the obvious!

## Your Turn

Any stories you’d like to share?

## More information

This presentation and a handout will be posted on Daryl’s web page late next week.

<http://faculty.etsu.edu/stephen/>

Look for link on the page.

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