The Indian Love-Affair With Numbers

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Indians (as in the country)

- Simple decimal system
- Most advanced methods of counting, weighing, and measuring (2550-1550 BC)

Impact of Hinduism

- Most significant: Decimal System which was perfected by three inventions:

1. Special Number Symbols unconnected with any outside influence
2. Place System: the value of a number depends on position
3. The use of a symbol for zero to show the place add nothing to the number

Pythagoras?

- Ancient Indians actually used what we call the “Pythagorean Theorem” as well as Pythagorean triples.

Mathematical Writing

- Hindu scholars wrote in verse
- Pleasant and flattering words
- Math as recreation

Jaina Mathematics

- Religious center at Patna
- School of mathematics for several centuries
- Aryabhata studies here
- Ten topics taught at school:

1. Parikarma: Four operations in arithmetic
2. Vyavahara: Concrete Application Problems
3. Rajju: Geometry
4. Rasi: Solid Geometry
5. Kalasavarma: Fractions
6. Yavat-tawat: Algebra
7. Varga: Squares
8. Varga-varga: Powers and Roots
9. Ghana: Cubes
10. Vikalpa: Permutations and Combinations

~ Similar to Algebra II??????

The Pulverizer

- Aryabhata's Method: "Pulverize" two numbers, then put together the pieces.

EX: 137 (x) + 10 = 60 (y)

1. Choose the numbers 2,3,1,1.
2. Choose the number 18 because 1(18) – 10 = 8 where 1 is the last remainder, 10 is take from the original equation, and 8 is our last divisor.

137/60 = 2 r 17
60/17 = 3 r 9
17/9 = 1 r 8
9/8 = 1 r 1

Example Continued

4. Now take 18 x 1 +1 = 19 where 18 is the number we computed, multiply it by the last whole number part of the answer and add 1 because it was the number

The final three equations would be:

19 x 1 +18 = 37

37 x 3 + 19 = 130

130 x 2 + 37 = 297

What does this mean?

- One solution is x = 130, y = 297
- Other solutions are found by adding or subtracting 60 for new x's and 137 for new y's.

- Now try it for:

19(x) +5 = 12(y)

Bhramagupta (598 c. – 665)

- First systematic treatment of negative numbers and zero
- Rules for mult. And dividing +/-
- General solution for quadratic equation and realized one root was positive and the other negative

Bhaskara (1114-1185)

- Book called The Gem of Mathematics which is in four parts.
- Included work of the Pulverizer method