In the Footsteps of Matteo Ricci Sigma Zeta Spring 2008

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The Holy Cross Study Tour of China
"In the Footsteps of Matteo Ricci"

Matteo Ricci

At the end of about 18 pages of discussion of the history of Chinese mathematics , Victor Katz writes:

> *Finally, in the late sixteenth century, with the arrival of the Jesuit priest Matteo Ricci (1552-1610), Western mathematics entered China and the indigenous tradition began to disappear.*

Matteo Ricci

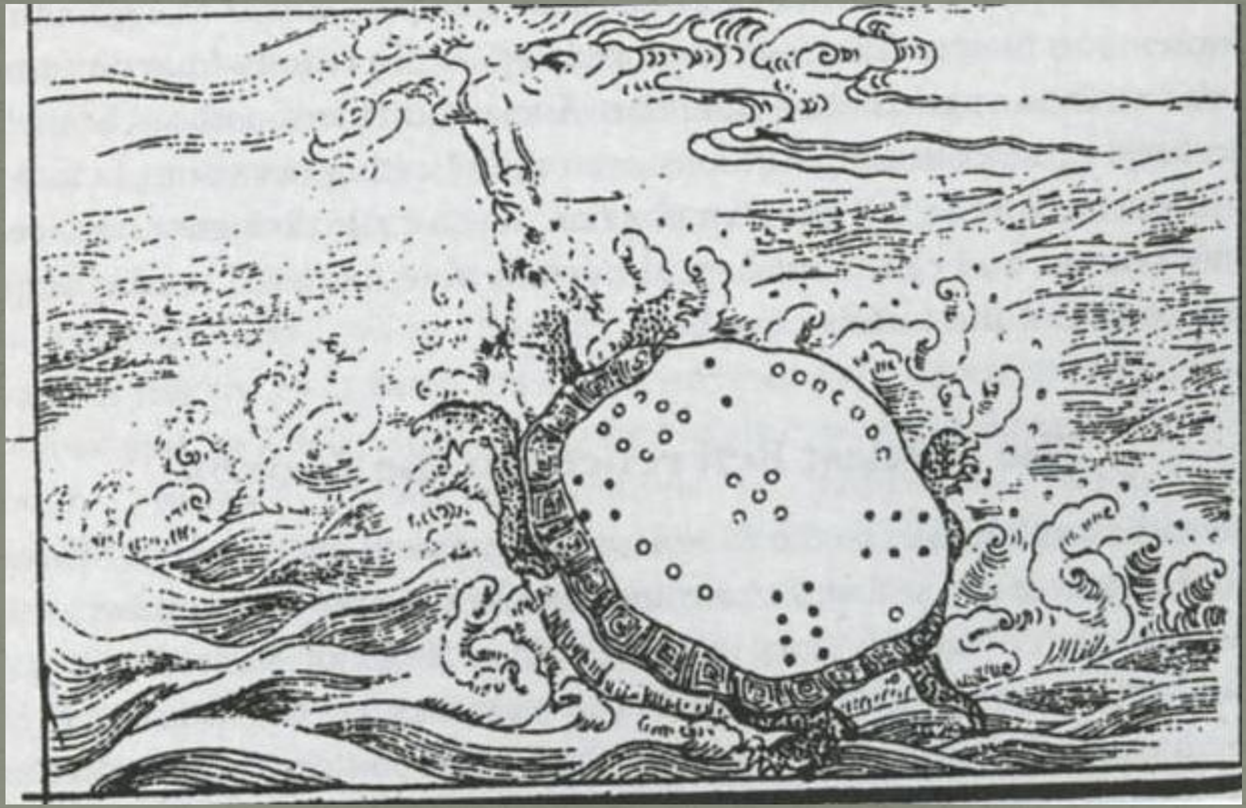
Matteo Ricci

Xu Guangqi

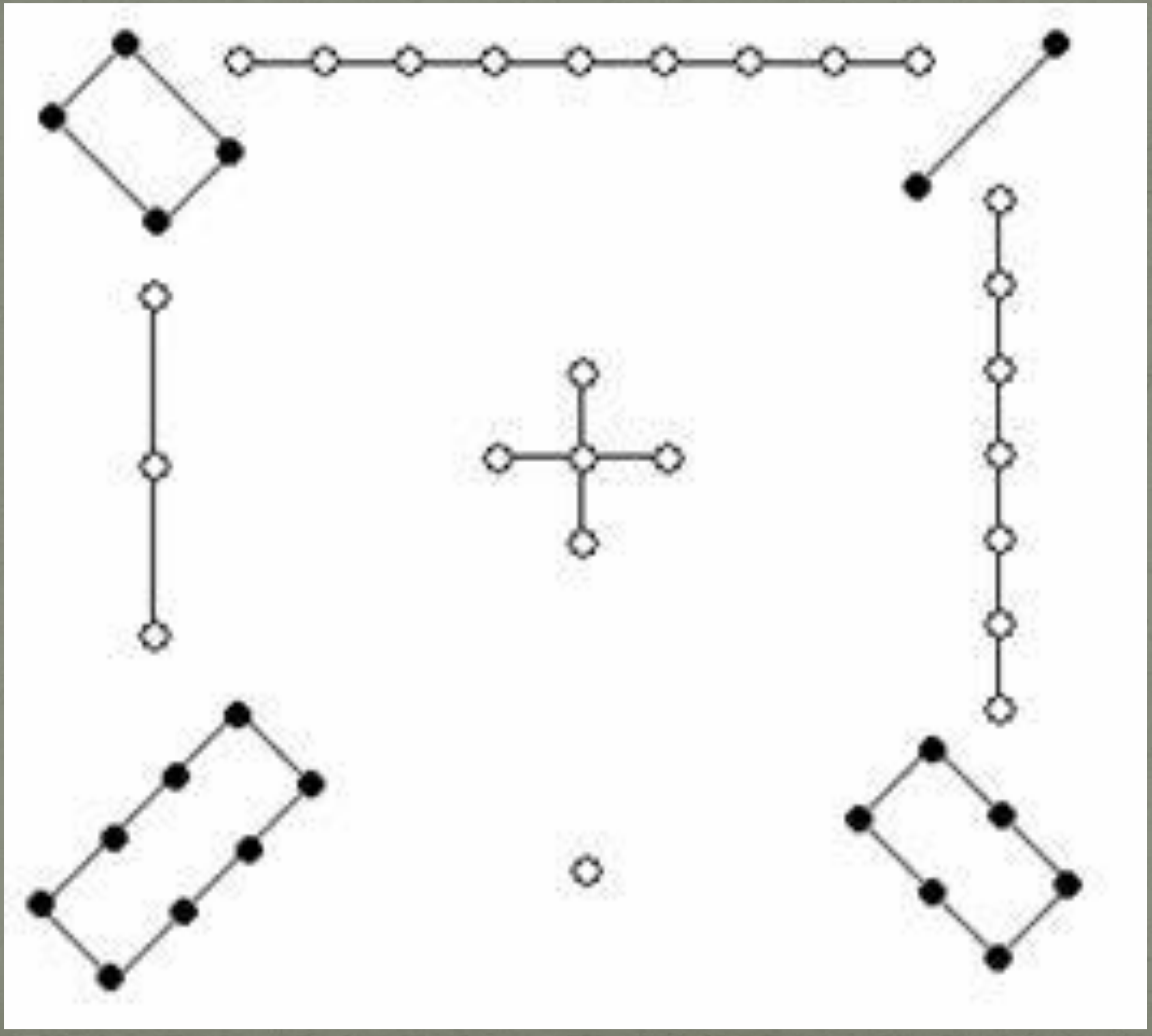
One notable mathematical contribution of Matteo Ricci was the translation of the first six books of Euclid's *Elements* into Chinese with the help of **Xu Guangqi** (1562-1633)

Indigenous Chinese Math

Lo-Shu



Lo-Shu



Binomial Expansion

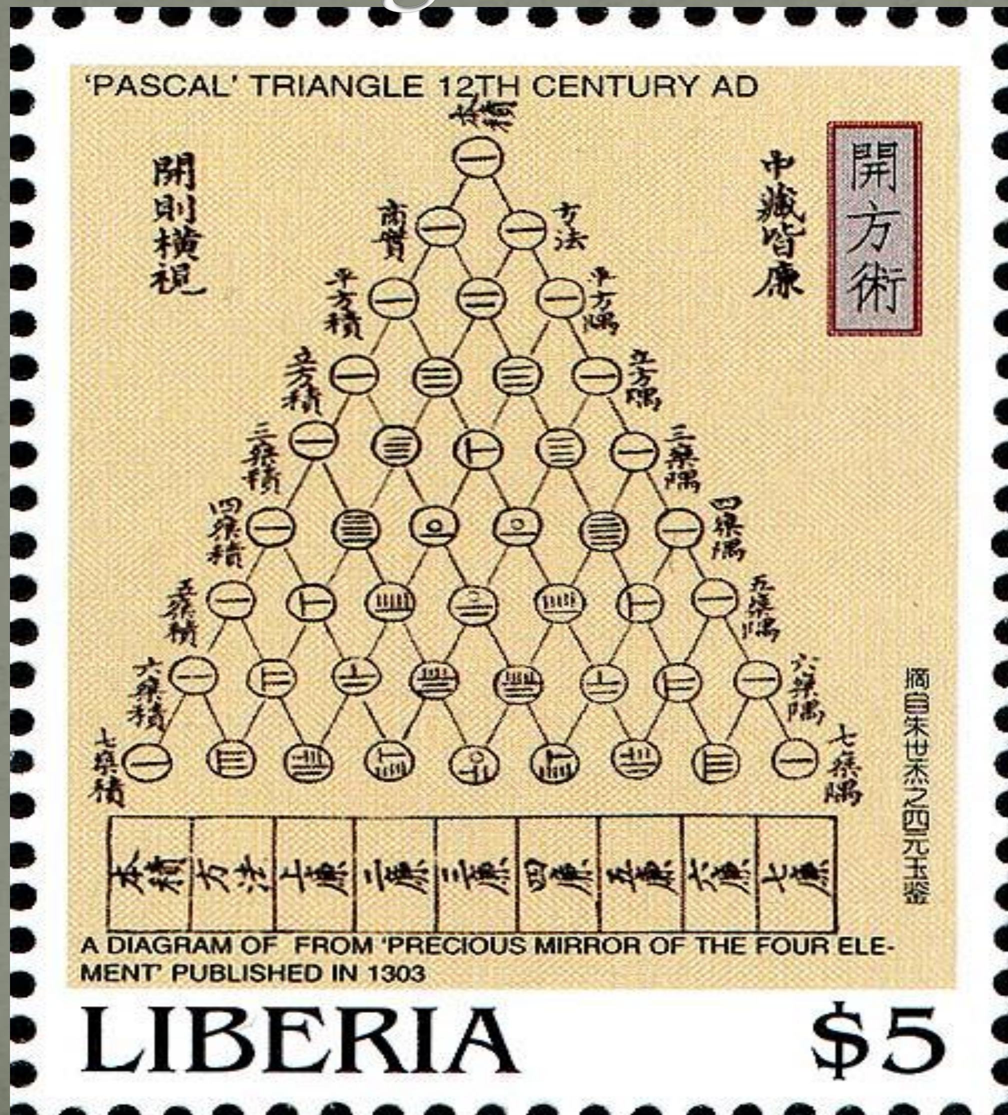
$$(a+b)^0 = 1$$

$$(a+b)^1 = a+b$$

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

Pascal’s Triangle



Pascal's Triangle

Each row makes up the coefficients of the binomial expansion of

$(x + y)^n$

The sum of the numbers in any row is equal to 2 to the n^{th} power or 2^n, when n is the number of the row. (Starting with $n = 0$)

Pascal's Triangle

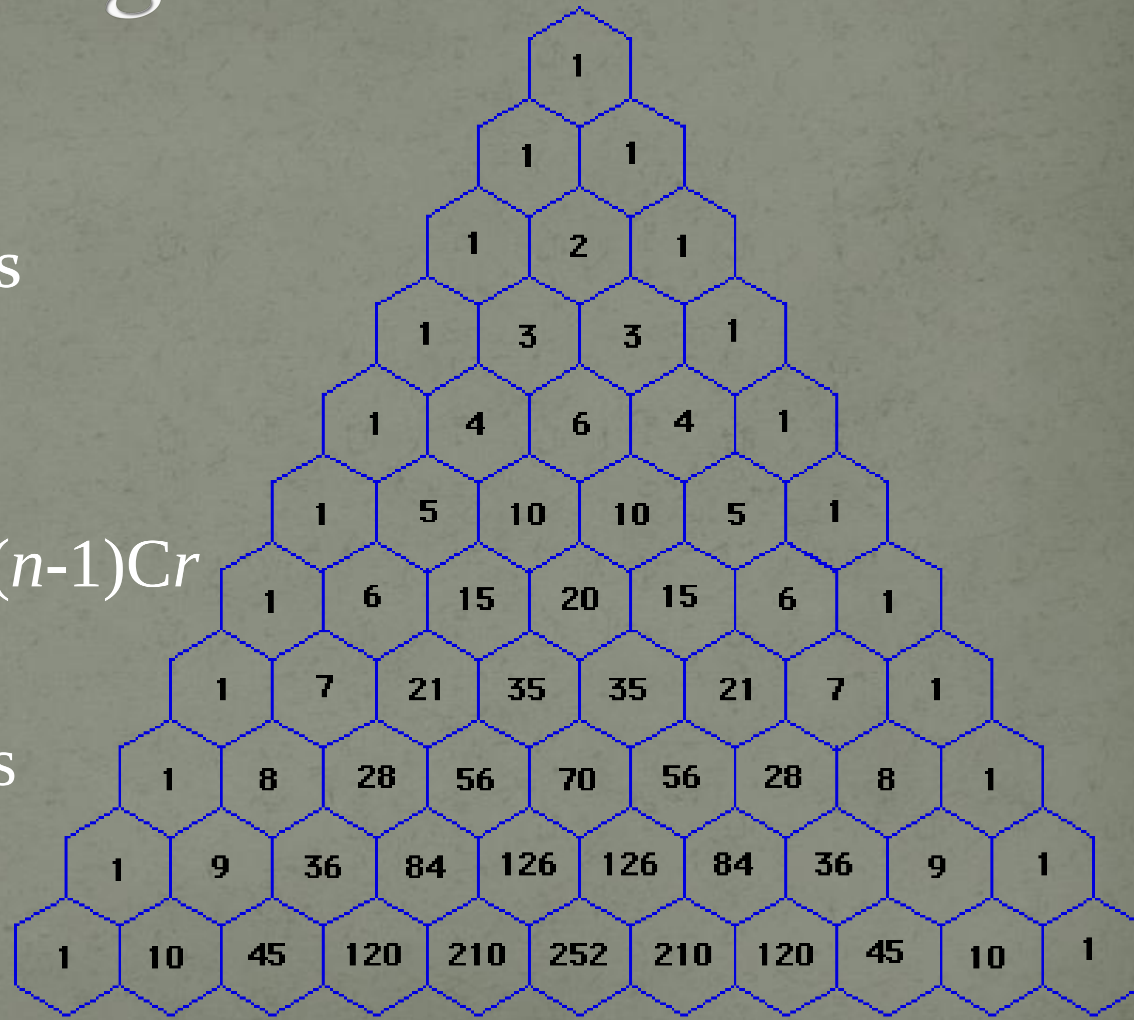
Powers of 11

Triangular Numbers

$nCr = n!/(r!(n - r)!)$

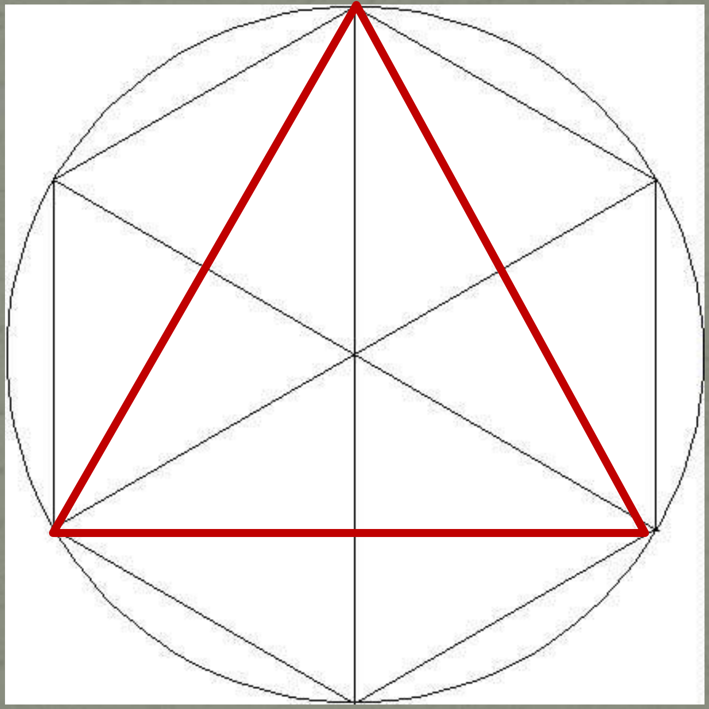
$nCr = (n-1)C(r-1) + (n-1)Cr$

Discovered 300 years later by Pascal.



Blaise Pascal

Archimedes (287-212 BCE)



Archimedes (287-212 BCE)

Using a 96 sided inscribed and circumscribed polygons Archimedes found the following estimation:

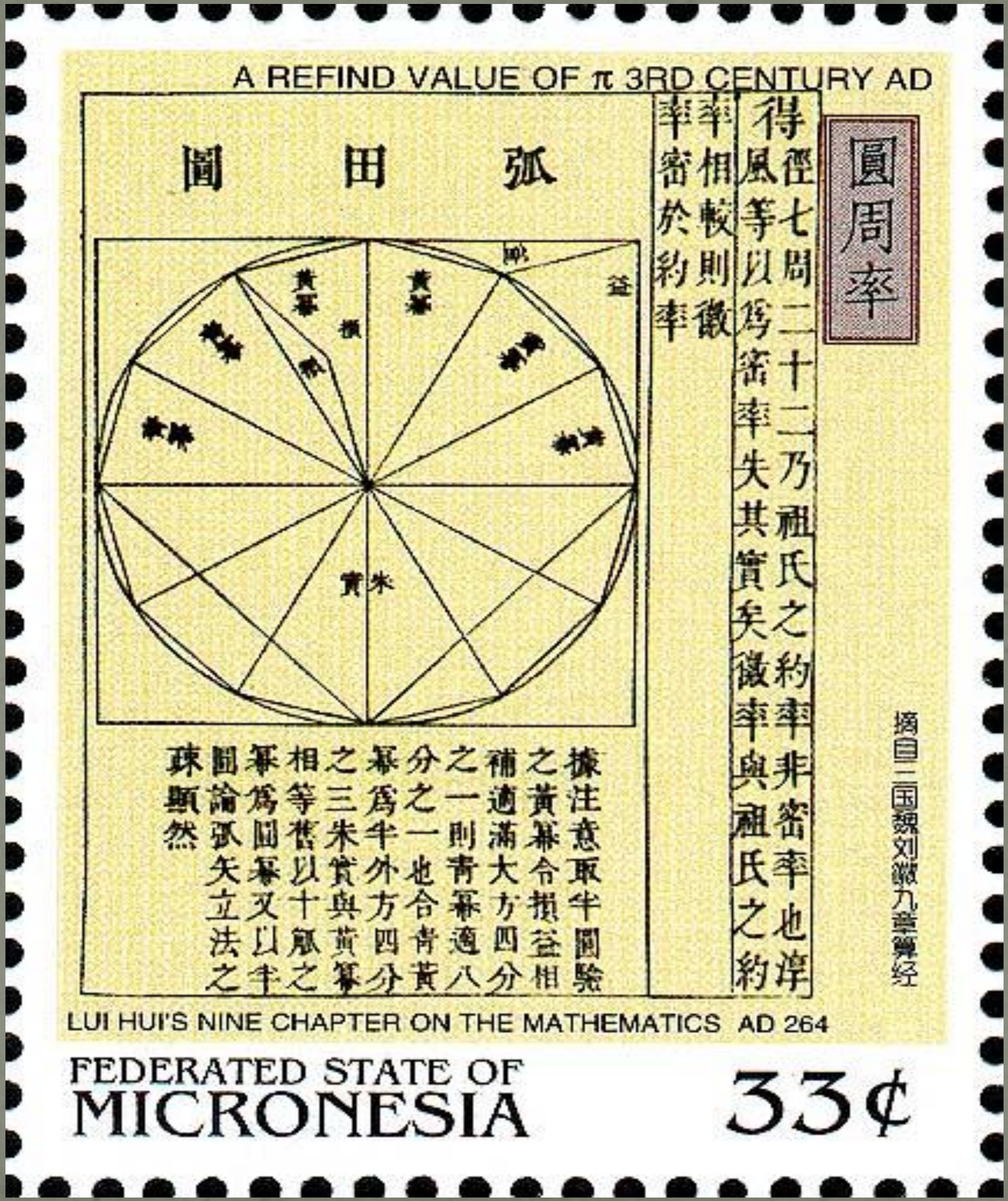
$$3\frac{10}{71} < \pi < 3\frac{1}{7}$$

Liu Hui

Using a method similar to Archimedes, Liu Hui calculated the areas of regular polygons with 96 and 192 sides, and approximated pi to be between 3.1410 and 3.1427.

With a polygon of 3,072 sides he determined 3.14159 to be the value of pi.

Lui Hui


A REFIND VALUE OF π 3RD CENTURY AD
圓周率
弧田圖
摘自三国魏刘徽九章算经
LUI HUI'S NINE CHAPTER ON THE MATHEMATICS AD 264
FEDERATED STATE OF
MICRONESIA
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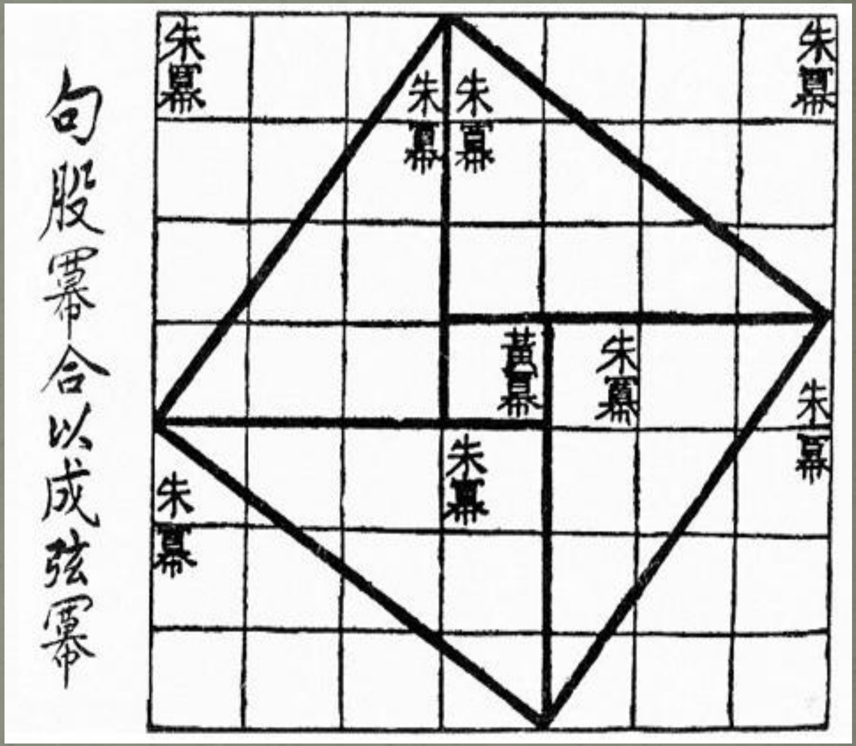
Tsu Ch'ung-Chih

Using regular polygons with 12,288 and 24,576 sides , he calculated pi to be between 3.1415926 and 3.1415927, an accuracy not achieved in the west for another 1000 years.

He also gave the "best" rational approximation, 355/113 , with a three digit denominator, for pi.

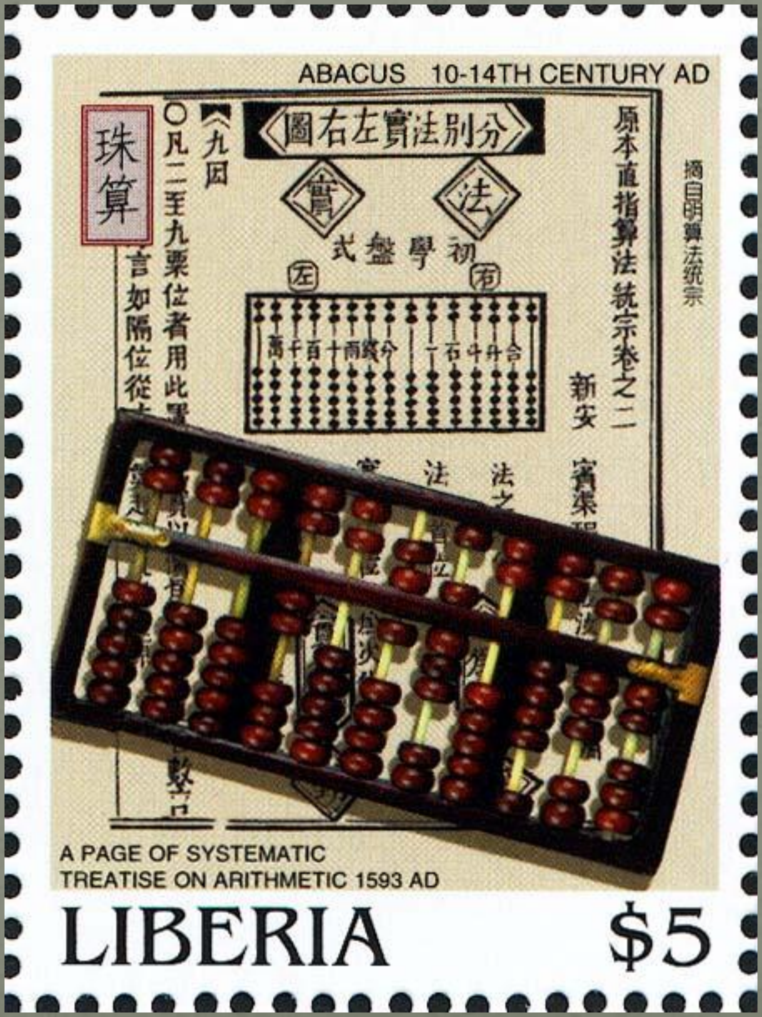
Pythagorean Theorem

- The Chinese text, "Chou Pei Suan Ching" provides a graphical proof of what we come to know as Pythagorean theorem in 200 BCE.
- This work was known to Lui Hui as the Gougu Theorem.



Cue Movie!

Abacus



ABACUS 10-14TH CENTURY AD
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