

Mathematics on Stamps

Robert McGee

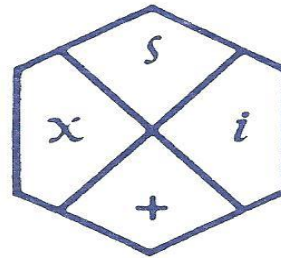
November 7, 2013

mathhappy.com

**ASSOCIATION OF MATHEMATICS
TEACHERS OF NEW YORK STATE**

28TH ANNUAL MEETING

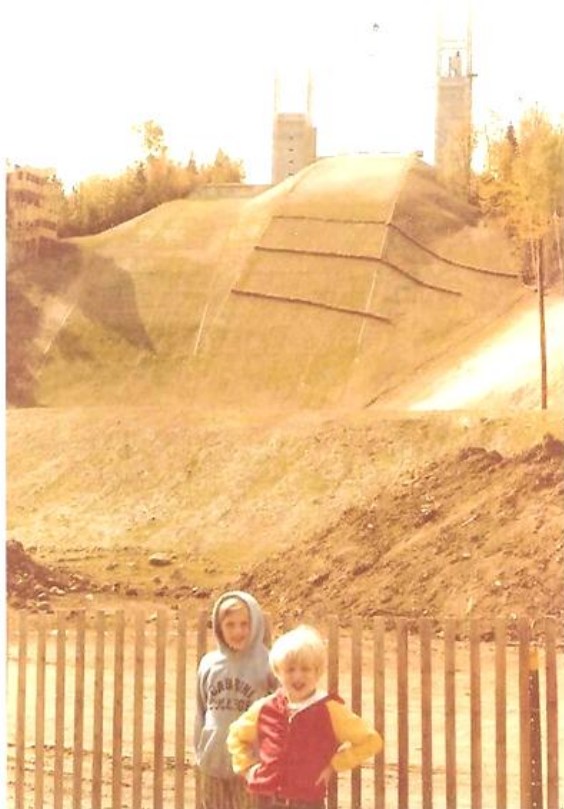
ASSOCIATION OF MATHEMATICS TEACHERS

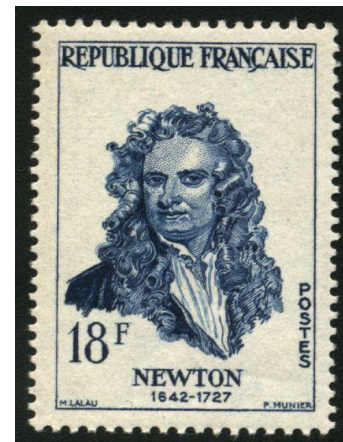


OF NEW YORK STATE

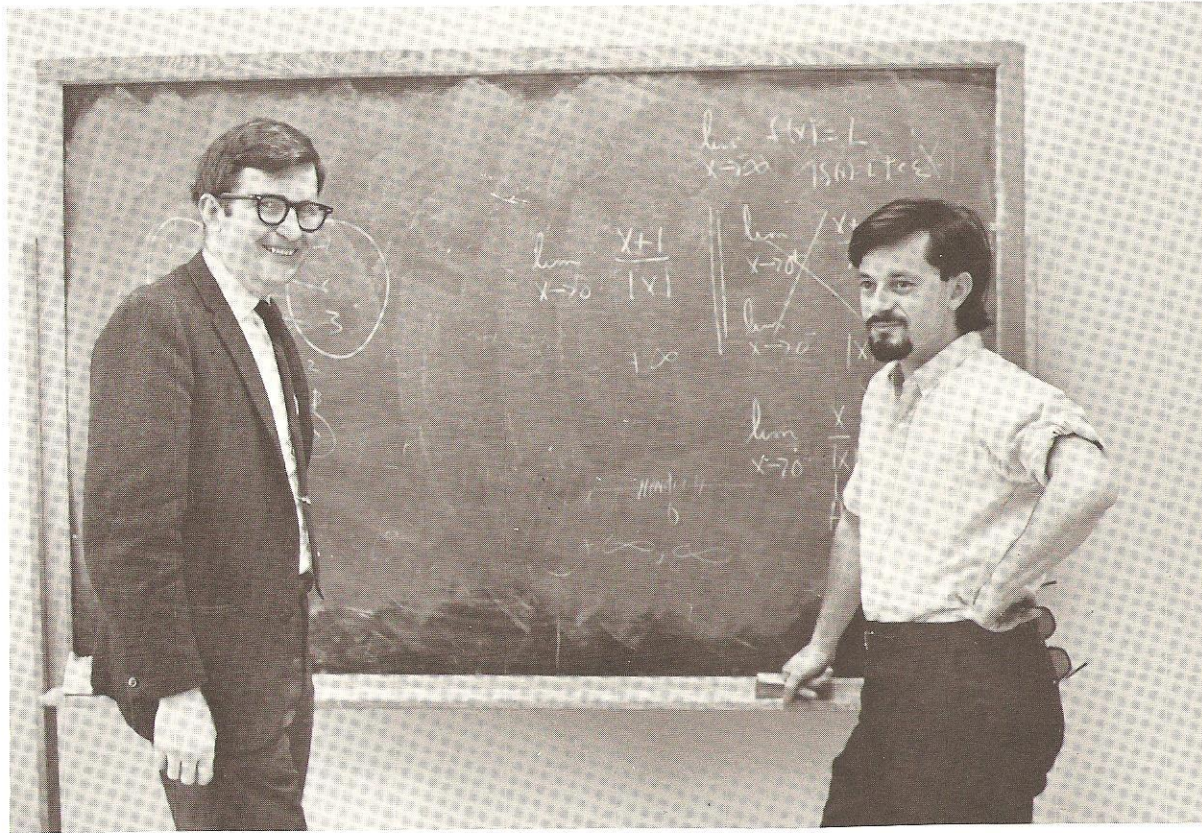
SEPTEMBER 28, 29, 30, 1978

**LAKE PLACID CLUB
LAKE PLACID, NEW YORK**





mathematics



MR. MICHAEL MCGHEE, MR. J. SATLOW.

Tool Kit

1. Images of Mathematics on Postage Stamps

<http://jeff560.tripod.com/stamps.html>

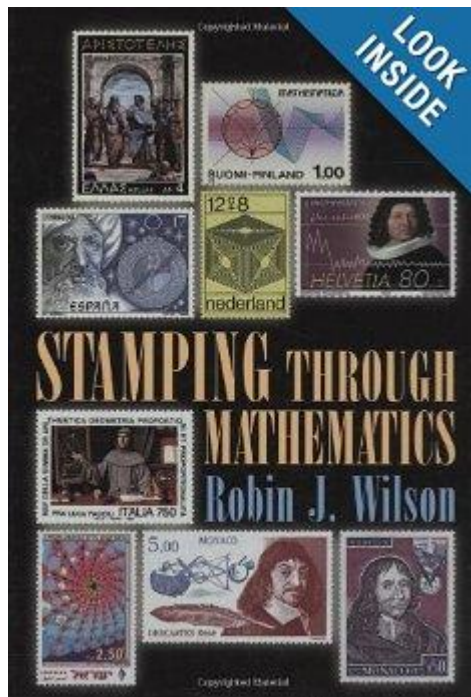
Very large number of images of mathematics and mathematicians.

2. The MacTutor History of Mathematics Archive

<http://www-history.mcs.st-and.ac.uk/>

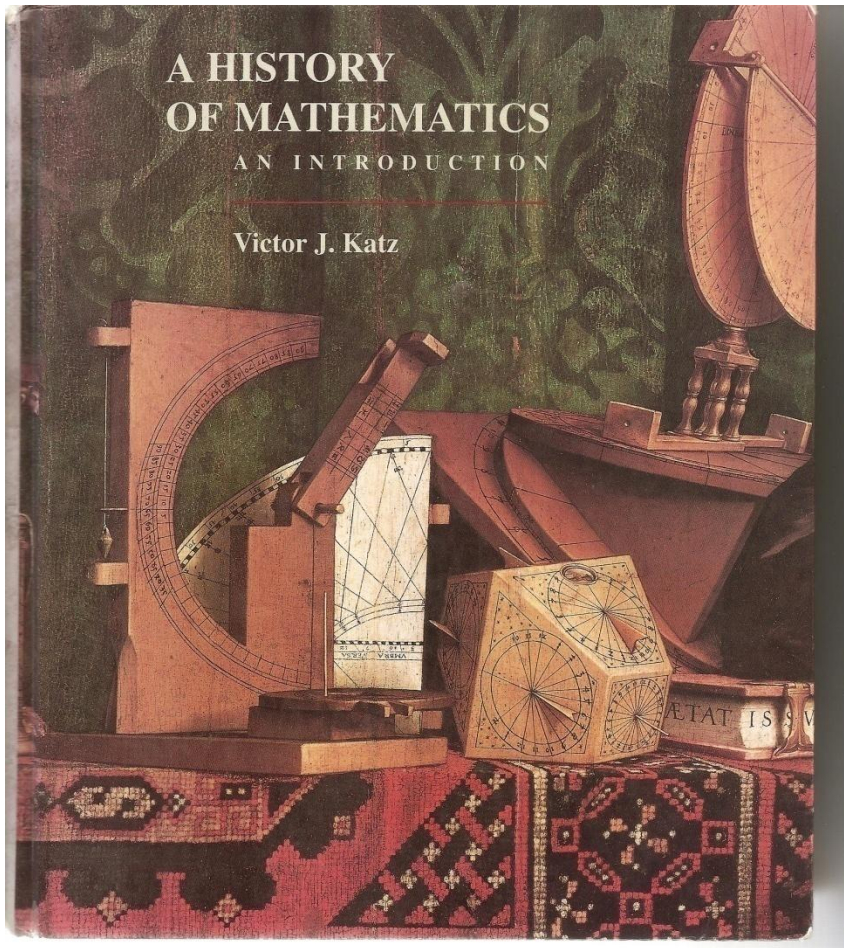
Massive number of biographies of mathematicians as well as other topics.

Tool Kit



- This book contains pictures of over 300 stamps arranged as 55 different themes

Tool Kit



- This book is an excellent and comprehensive history of mathematics. It also contains the images of 85 stamps that illustrate various parts of the text.

Tool Kit

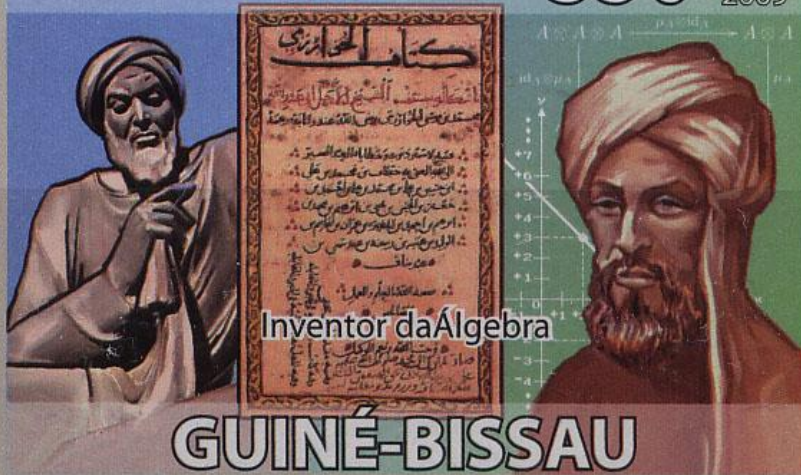
- <http://mathstamps.org/philamath32.html>
- This link connects you to Philamath a journal published quarterly by the Mathematical Study Unit. Information can be obtained for receiving a free copy of the publication, membership, \$12 a year and obtaining a CD-ROM containing all 34 years of the journal as well as a checklist of over 5000 items pertaining to mathematics on stamps, \$15.

AL-KHOWARIZMI



Muhammad al-Khwarizmi (780-850)

350 FCFA
2009



Inventor da Algebra

GUINÉ-BISSAU



**Abu Ja'far
Muhammad ibn Musa
Al-Khwarizmi
about 790 - about 850**

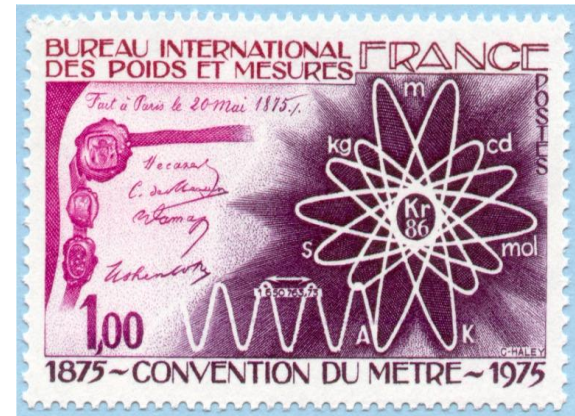
Click the picture above
to see two larger
pictures

Al'Khwarizmi was an Islamic mathematician who wrote on Hindu-Arabic numerals and was among the first to use zero as a place holder in positional base notation. The word *algorithm* derives from his name. His algebra treatise *Hisab al-jabr w'al-muqabala* gives us the word *algebra* and can be considered as the first book to be written on algebra.

The Metric System

- With the signing of “The Treaty of the Meter” by 17 countries in Paris in 1875, the ground work was laid for a universal system of weights and measures. There are a lot of stamps commemorating this event, especially its centenary or a particular countries adoption of the metric system. Some examples follow.

The Metric System



KENYA UGANDA

Conversion to the Metric System of Weights & Measures

1 MILLILITRE = 0.00704 GILL
 1 LITRE = 0.21996 GAL.
 1 DECILITRE = 0.17598 PINT
 1 CENTILITRE = 0.0089 GILL

TANZANIA 1'50

TANZANIA UGANDA

Conversion to the Metric System of Weights & Measures

1 GRAMME = 15.43236 GRAINS
 1 TONNE = 0.98420 TON
 1 HECTOGRAMME = 3.5274 OUNCES
 1 KILOGRAMME = 2.2046223 LBS

KENYA 30^c

UGANDA TANZANIA

Conversion to the Metric System of Weights & Measures

FAHRENHEIT 212° 100°
 122° 50°
 80° 27°
 32° 0°
 CENTIGRADE

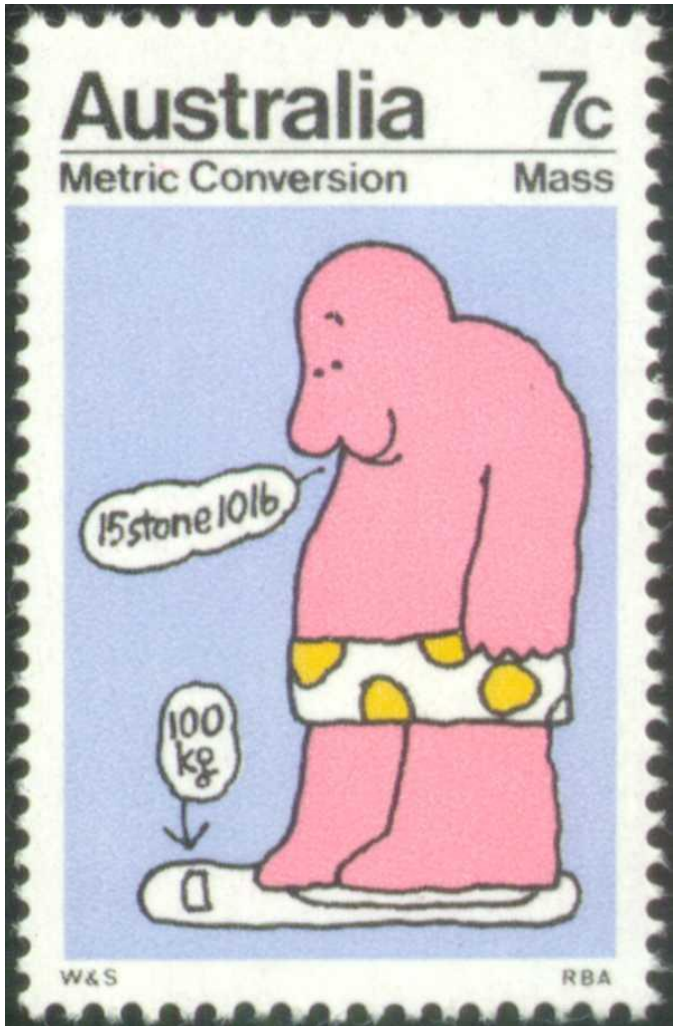
KENYA 70^c

TANZANIA KENYA

Conversion to the Metric System of Weights & Measures

1 METRE = 3.28083 FT.
 1 KILOMETRE = 0.62137 MILE
 1 MILLIMETRE = 0.03937 INCH
 1 CENTIMETRE = 0.39370 INCH

UGANDA 2'50



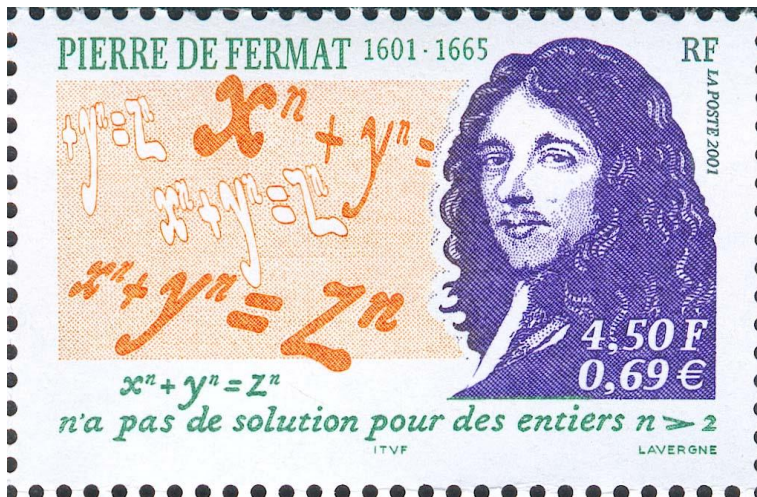
The Mathematics of the Honeycomb *



- An excellent video with this title exists which explains some interesting mathematical aspects of the honeycomb

Fermat's Last Theorem

- Statement of Theorem
- Announcement of Proof



Fibonacci Numbers/Golden Ratio

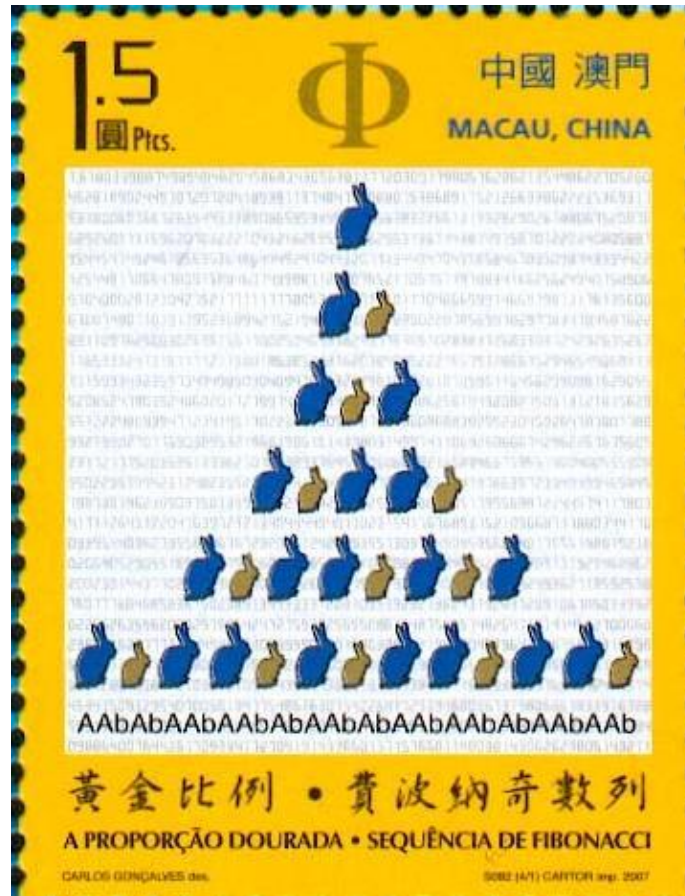


<p>1.5 圓 Pts. Φ 中國 澳門 MACAU, CHINA</p> <p>黃金比例 · 費波納奇數列 A PROPORÇÃO DOURADA · SEQUÊNCIA DE FIBONACCI</p>	<p>2.0 圓 Pts. Φ 中國 澳門 MACAU, CHINA</p> <p>黃金比例 · 向日葵螺線 A PROPORÇÃO DOURADA · ESPIRAL DO GIRASSOL</p>
<p>3.5 圓 Pts. Φ 中國 澳門 MACAU, CHINA</p> <p>黃金比例 · 鸚鵡螺 A PROPORÇÃO DOURADA · NAUTILUS</p>	<p>2.5 圓 Pts. Φ 中國 澳門 MACAU, CHINA</p> <p>黃金比例 · 彭羅斯鑲嵌 A PROPORÇÃO DOURADA · LADRILHOS DE PENROSE</p>

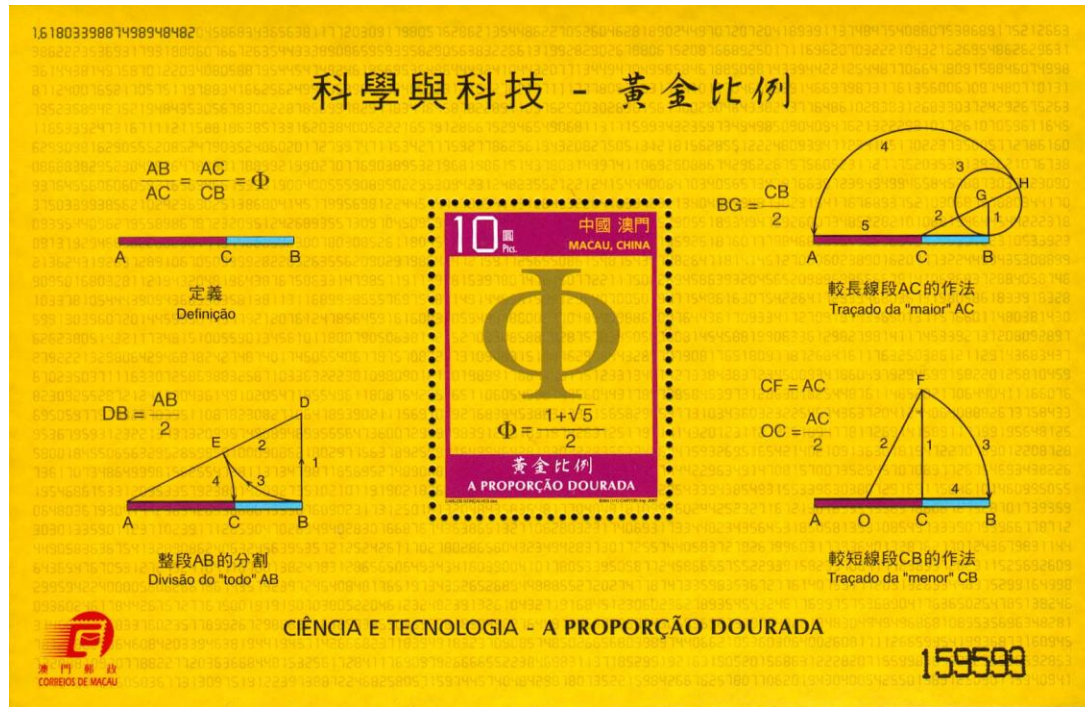
Fibonacci Numbers/Golden Ratio

- Fibonacci posed this problem in the *Liber Abaci*: “Someone placed a pair of rabbits in a certain place, enclosed on all sides by a wall, to find out how many pairs of rabbits will be born there, it being assumed that every month a pair of rabbits produces another pair, and that rabbits begin to bear young two months after their birth.

Fibonacci Numbers/Golden Ratio



Fibonacci Numbers/Golden Ratio



- The definition of the golden ratio is given in the upper right part of the stamp. Its value is contained in the center of the stamp

Fibonacci Numbers/Golden Ratio



Fibonacci Numbers/Golden Ratio



The Good Die Young



The Good Die Young



СОФЬЯ ВАСИЛЬЕВНА КОВАЛЕВСКАЯ
1850—1891



Куда _____

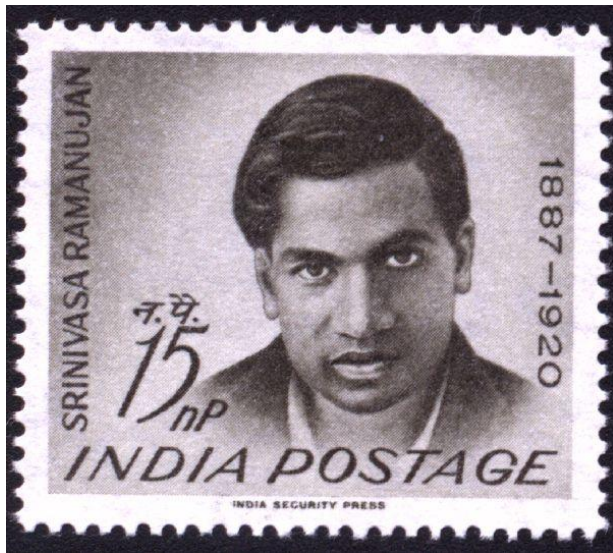
Кому _____

Индекс предприятия связи и адрес
отправителя



Индекс предприятия связи места назначения

The Good Die Young 1729



- The largely self taught Ramanujan was mentored by G.H. Hardy

Paul Erdos 1913-1996



- Paul Erdos was the most prolific mathematician of the 20th century with over 1500 papers to his credit. He devoted his life to the doing of mathematics. No stamp exists honoring him, or does it?

Hungarian Millennium Stamp



This stamp honors 57 Hungarian mathematicians and contains a hologram.

Mathematics on Stamps Part 2

- This material was not discussed in the presentation. It contains 3 longer themes and a few more of my own favorite stamps. I will try to provide enough information to give a context for the material. If you have comments or questions, please feel free to contact me by e-mail at
- robertmcgee01@comcast.net

Chinese Mathematics

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, Western mathematics entered China and the indigenous tradition began to disappear.*

Matteo Ricci



- Matteo Ricci, an Italian Jesuit priest, learned Chinese, studied Confucian philosophy and adopted the robes of a scholar in order to better communicate with his peers in China and share his knowledge of mathematics and science.

Matteo Ricci

- Matteo Ricci's skill as a mapmaker enabled him to construct an accurate map of China and locate its position and size in the world. He was much admired for this accomplishment.



Matteo Ricci



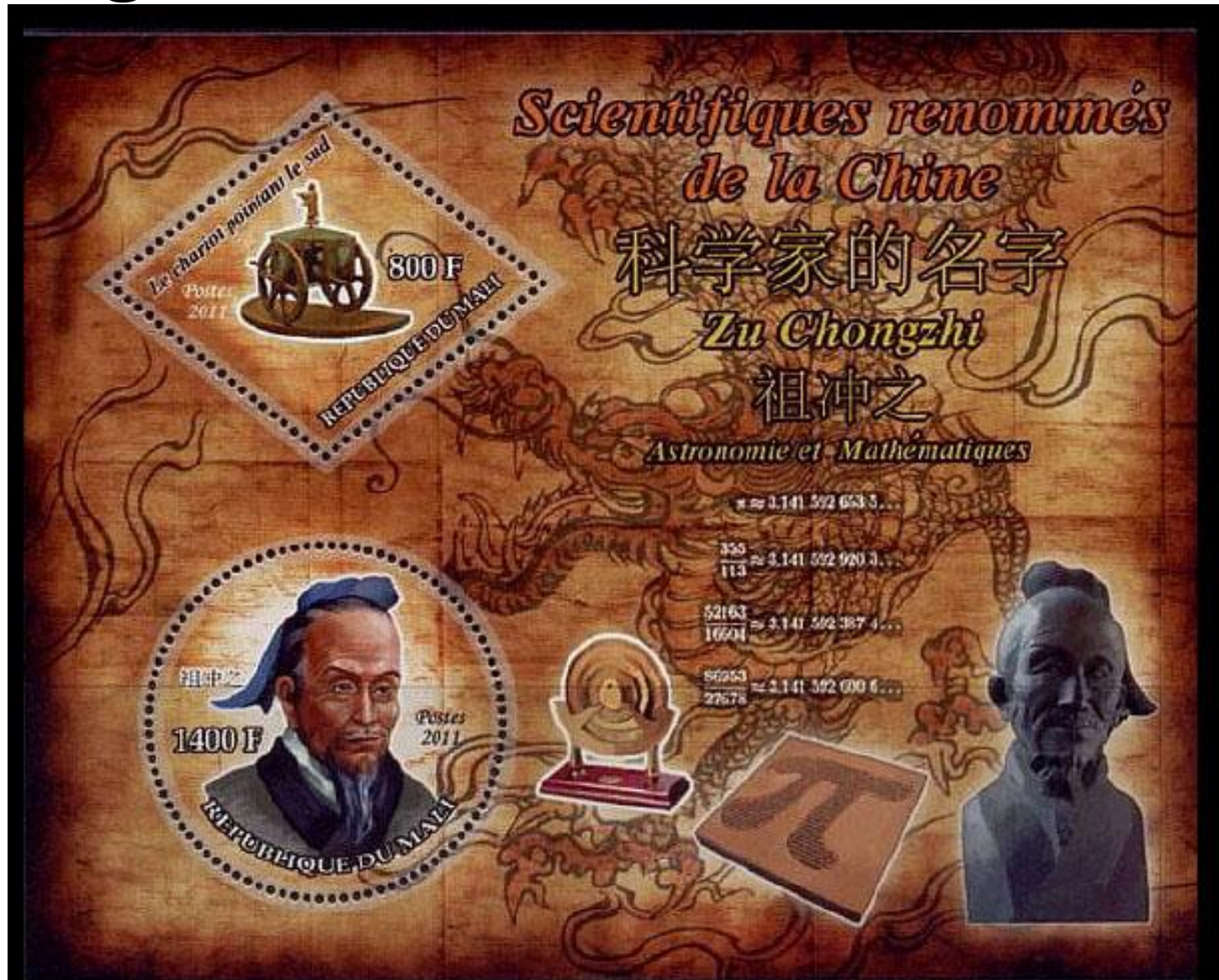
Matteo Ricci and Xu Guangqi translated the first six books of Euclid's *Elements* into Chinese, a daunting task since many of the terms and concepts did not exist in the Chinese language.

Indigenous Chinese Mathematics

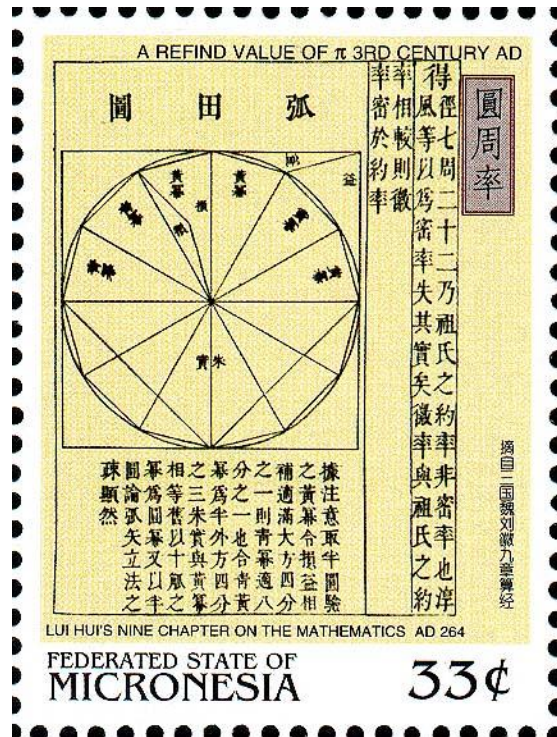


- Tsu Ch'ung-Chih obtained a value for Pi that was accurate to 6 decimal places and appears on the stamp. Such accuracy was not obtained in the west for over one thousand years. He also found the fraction $355/113$ which is the best rational approximation to Pi with a three digit denominator.

Indigenous Chinese Mathematics



Indigenous Chinese Mathematics



Non-Euclidean Geometry

A drama in several acts

The players in order of appearance

Euclid

Janos Bolyai

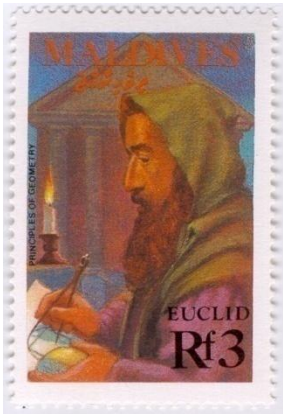
Farkas Bolyai

Karl Gauss

Nicolai Ivanovich Lobachevsky

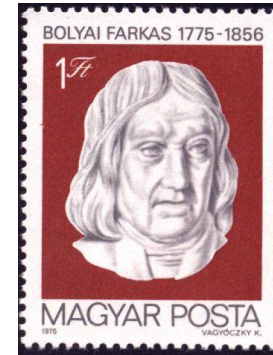
Bernhard Riemann

Euclid's Postulate 5



- Postulate 5 states: That, if a straight line intersecting two straight lines make the interior angles on the same side less than two right angles, the two straight lines, if produced indefinitely, meet on that side on which the angles are less than two right angles.
- Equivalent Statement: For every line l and for every point P that does not lie on l , there exists a unique line m through P that is parallel to l .

Non-Euclidean Geometry



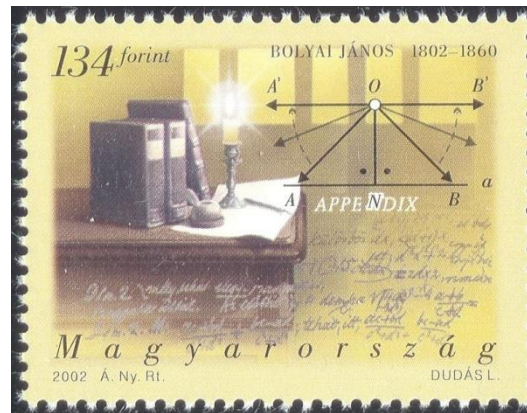
- Janos Bolyai explored the possibility of a geometry in which there could be more than one parallel line to a given line through a given point
- His father, Farkas Bolyai tried to discourage his son from these investigations but eventually sent his son's results to Carl Gauss

Non-Euclidean Geometry



- Carl Friedrich Gauss was one of the greatest mathematicians of all time. Janos Bolyai hoped that acceptance by Gauss would vindicate his work. Gauss responded, *to praise this work would be to praise myself*, indicating that he had already discovered these results.

Non-Euclidean Geometry



- Undeterred, in 1832, Janos published his results in an appendix to a work of his father. At least he would be the first one to publish these results. Maybe!

Non-Euclidean Geometry *

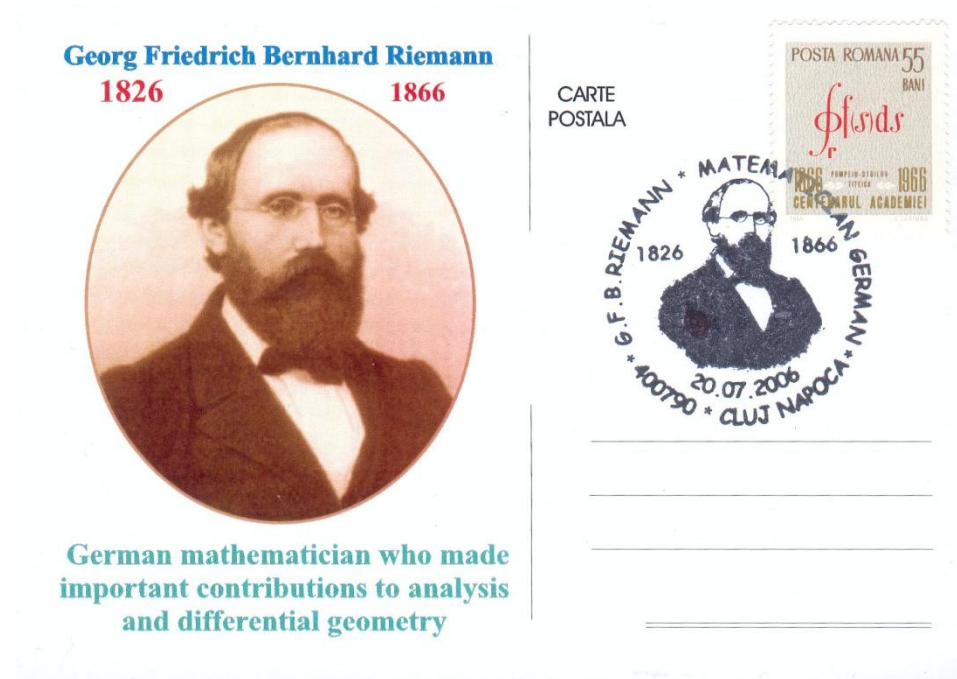


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In 1829 a Russian mathematician, Nikolai Lobachevski published a book containing the same results as Bolyai. Since it was in Russian, it took a while before the results were widely known

* For another version of this story see Tom Lehrer, *Lobachevsky*.

Non-Euclidean Geometry



- Riemann proposed a geometry in which there would be no parallel lines. This requires that other choices be made about the postulates of Euclid.

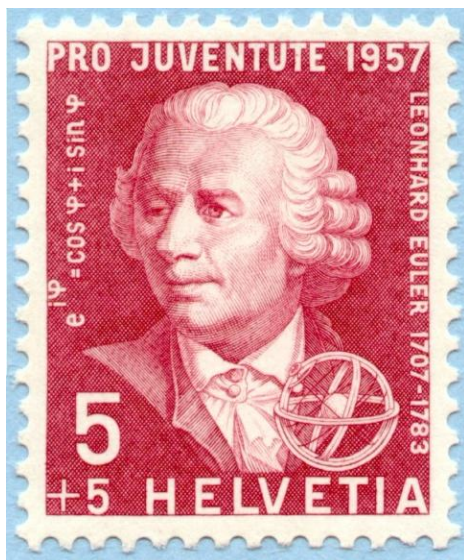
Leonhard Euler 1707-1783

- Leonard Euler wrote more mathematics than anyone in the history of mathematics. It took over 40 years for the papers that he had written before his death to be published. His work covered several major areas of mathematics, including algebra, analysis and number theory. He also worked in many areas of applied mathematics. He continued to do mathematics even though he was totally blind for the last dozen years of his life and had been partially blind for many years before that.

Leonard Euler

- The first two stamps of Euler contain formulas that he established. I will let you track down what the formulas refer to.
- The third stamp suggest Euler's blindness.
- The picture of Euler on the Swiss currency (not really a stamp)contains in the background Euler diagrams aka Venn diagrams.
- The last two stamps show Euler in the company of some other famous scientists.

Leonard Euler

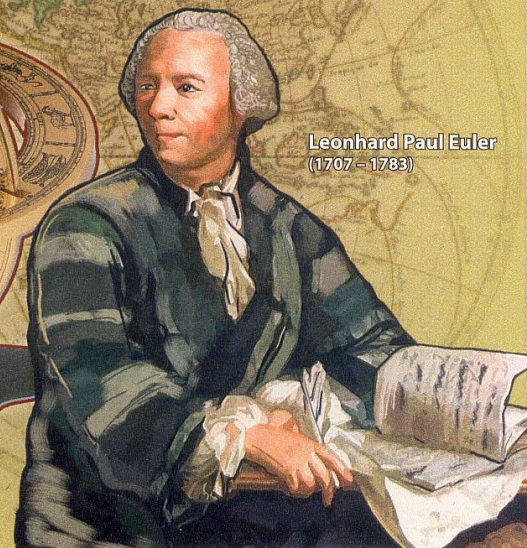
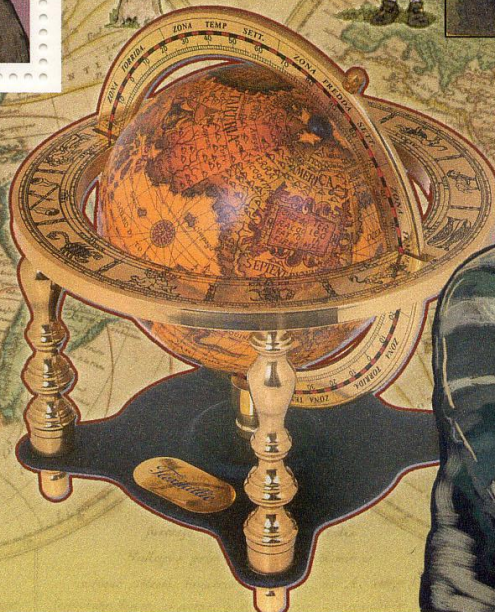
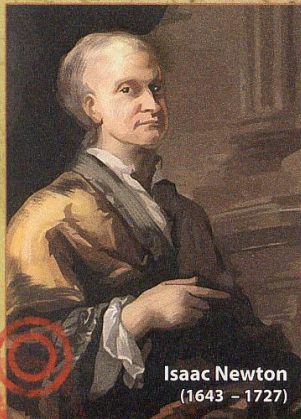
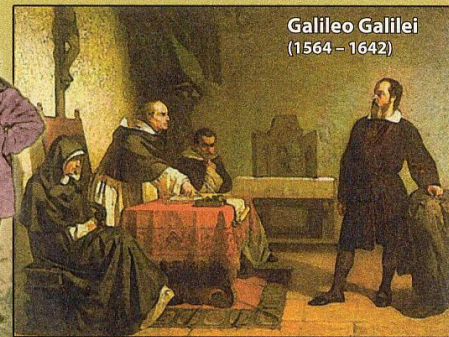
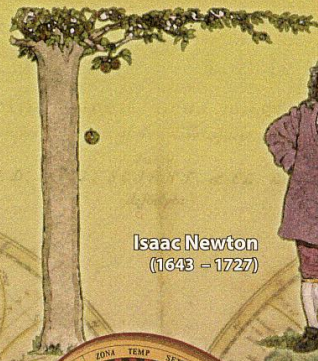
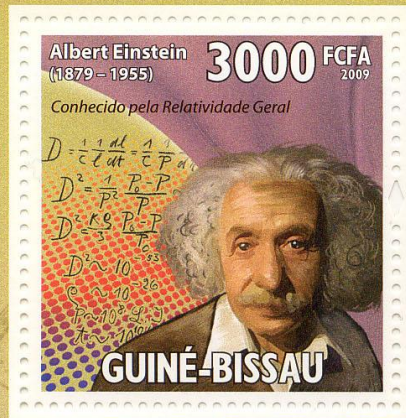


Leonard Euler



Leonard Euler

Grandes Físicos



Leonard Euler

GUINÉ-BISSAU
Inventou um hedômetro primitivo, e o primeiro calendário lunisolar mecânico

Abu Rayhan al-Biruni
(973-1048)

3500 FCFA
2008

Leonhard Euler (1707-1783)

William Herschel (1738-1822)

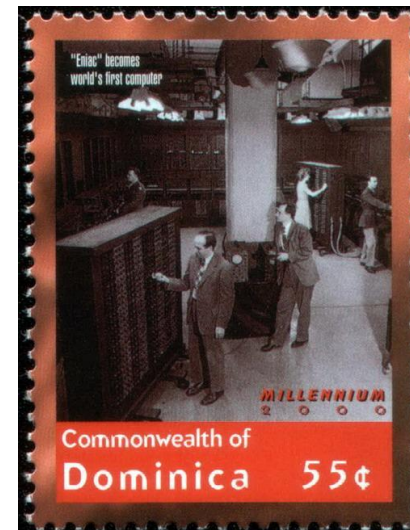
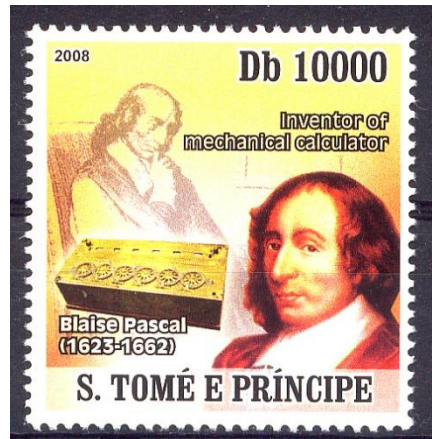
DESCOBERTAS
NA ASTRONOMIA

668502b

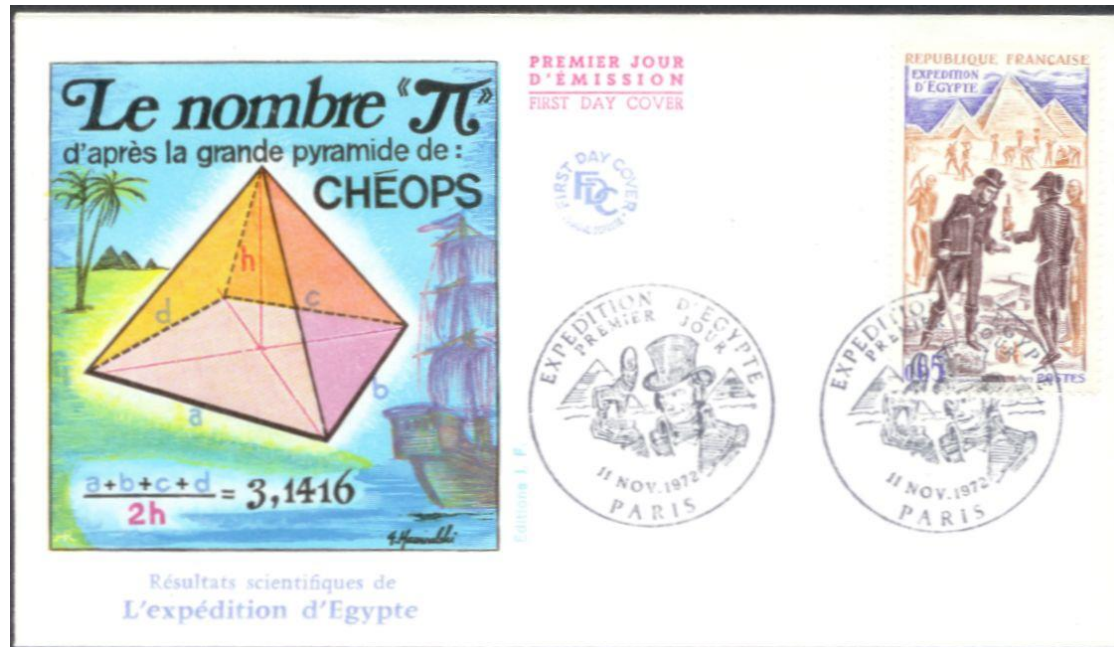
Computation



Computation

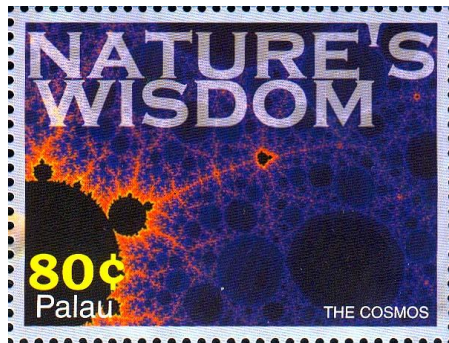


The Pyramid *



- * Suggested by Charlie McGrother

The Unexpected



Archimedes

