

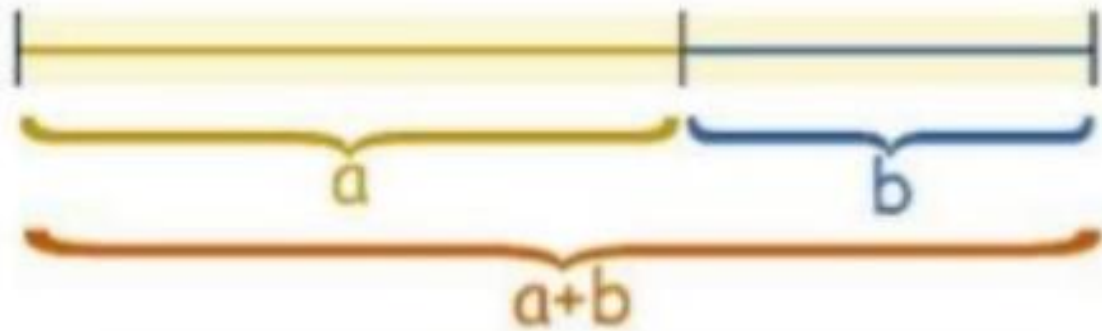
The slide features a light beige background with a faint, repeating pattern of palm trees. The title 'The Golden Ratio' is centered on a horizontal, light orange brushstroke. The slide is decorated with stylized tropical leaves in teal and orange, including monstera and palm fronds, positioned around the edges.

The Golden Ratio

Aziza Mankenova
2020-2021 Fall

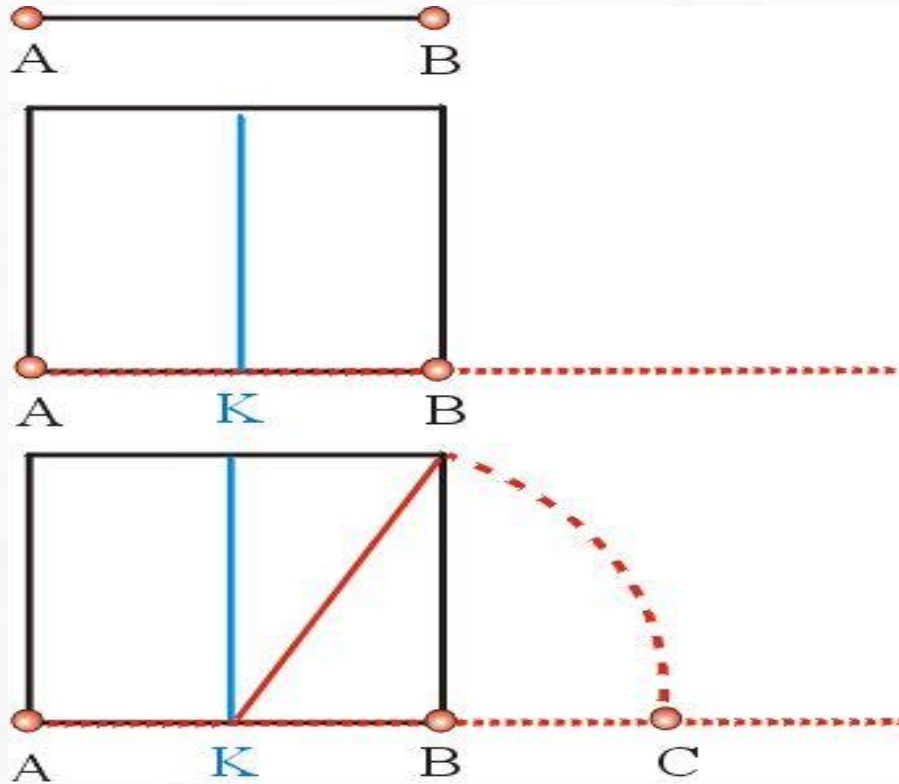
WHAT IS THE GOLDEN RATIO?

Golden ratio, also known as the golden section, golden mean, or divine proportion, in mathematics, the irrational number $(1 + \sqrt{5})/2$, often denoted by the Greek letter ϕ , and approximately equal to 1.618.

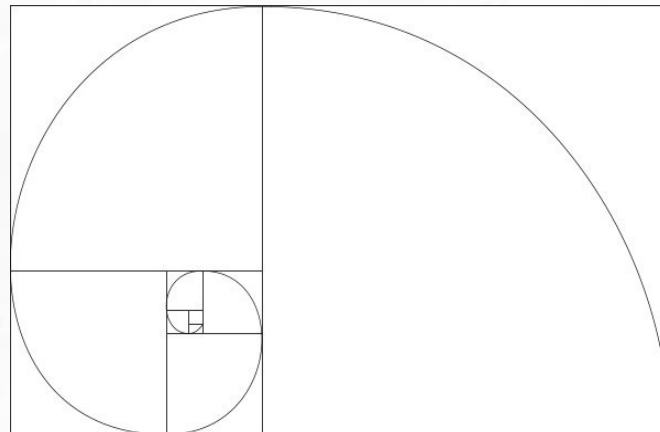
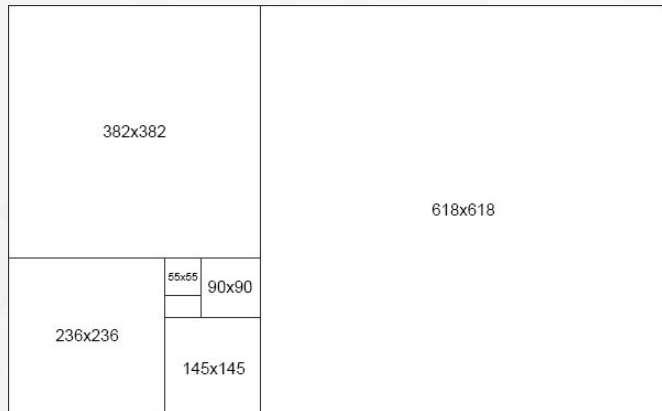
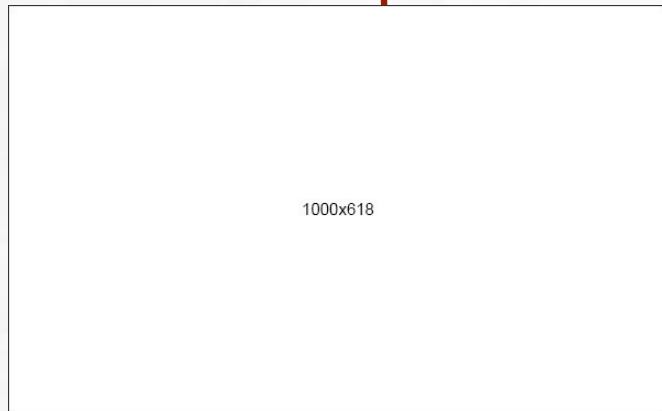


$$\frac{a}{b} = \frac{a+b}{a} = 1.618... = \varphi$$

Construction of the Golden Rectangle



The Golden Spiral



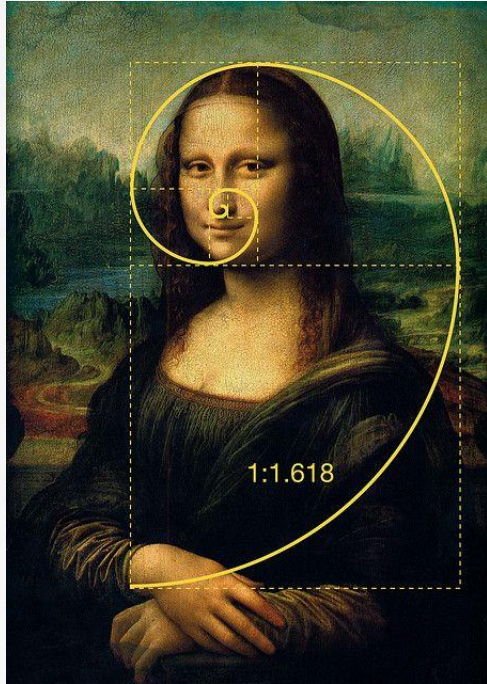
Relationship to Fibonacci sequence

Fibonacci Numbers: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610, 987, 1597, ...

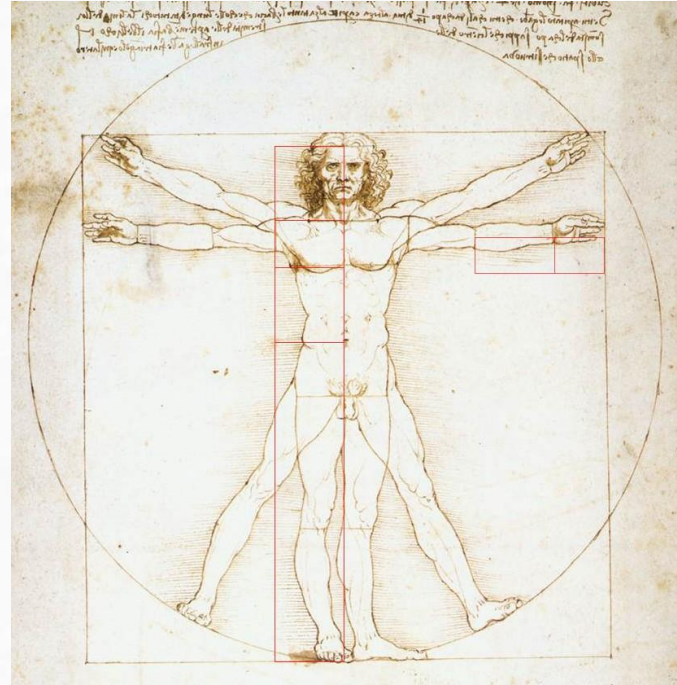
A closed-form expression for the Fibonacci sequence involves the golden ratio:

$$F(n) = \frac{\varphi^n - (1 - \varphi)^n}{\sqrt{5}} = \frac{\varphi^n - (-\varphi)^{-n}}{\sqrt{5}}$$

The Golden ratio in Art



"Mona Lisa"

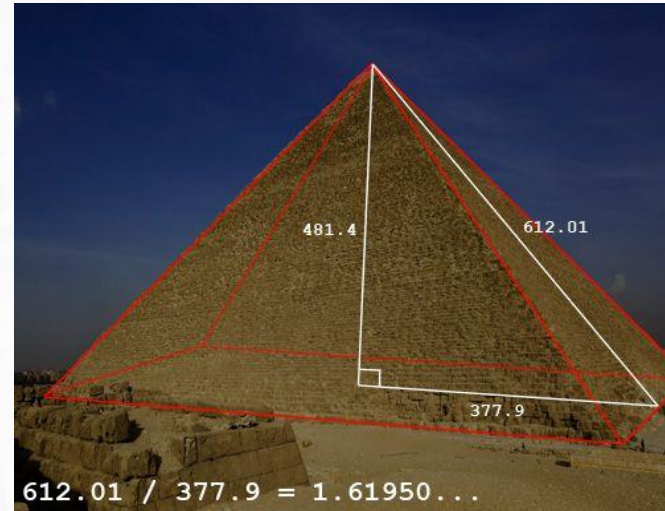


"Vitruvian Man"

The Golden Ratio in Architecture

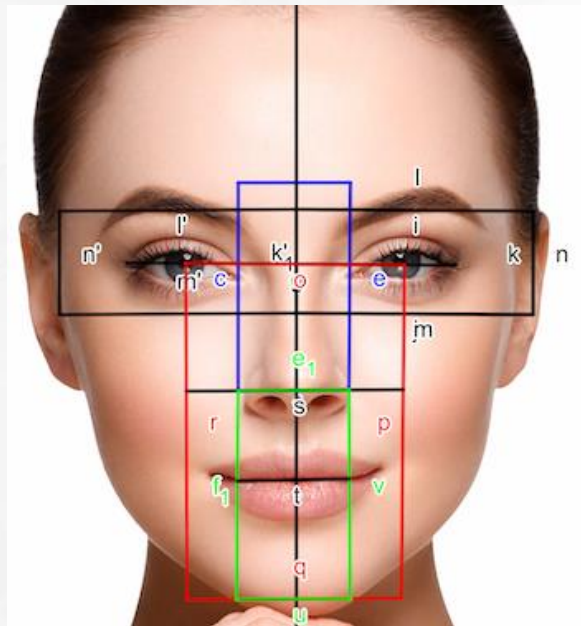


Parthenon in Athens



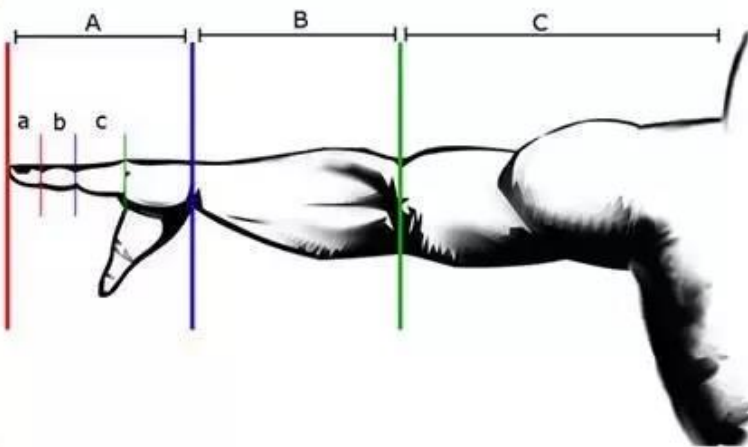
Egyptian Pyramid

The Golden Ratio in Human



Art Of Mathematics

$$\frac{C}{B} = \frac{B}{A} = \frac{c}{b} = \frac{b}{a} = \Phi = \frac{1 + \sqrt{5}}{2} = 1.618 \dots$$



The golden ratio is seen in the phalanges and the metacarpals of the hand.

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The Golden Ratio in Nature



Applications

LOREM IPSUM DOLOR!

Nam ac tincidunt eros. Phasellus maximus dolor quis ante congue pharetra. Suspendisse potenti. Aliquam fringilla ultricies dapibus. Morbi id lacus ac mauris porta tempus nec in nibh. Suspendisse nulla libero, elementum eget quam vulputate, varius commodo magna. Ut mollis viverra quam, ut accumsan lacus consequat in. Duis aliquam ullamcorper ante ac convallis. Nulla at nulla in urna facilisis porttitor.

20 pt

12 pt

$$\frac{20}{12} \approx 1.6$$

Typography



$$\frac{A}{B} \approx 1.618$$

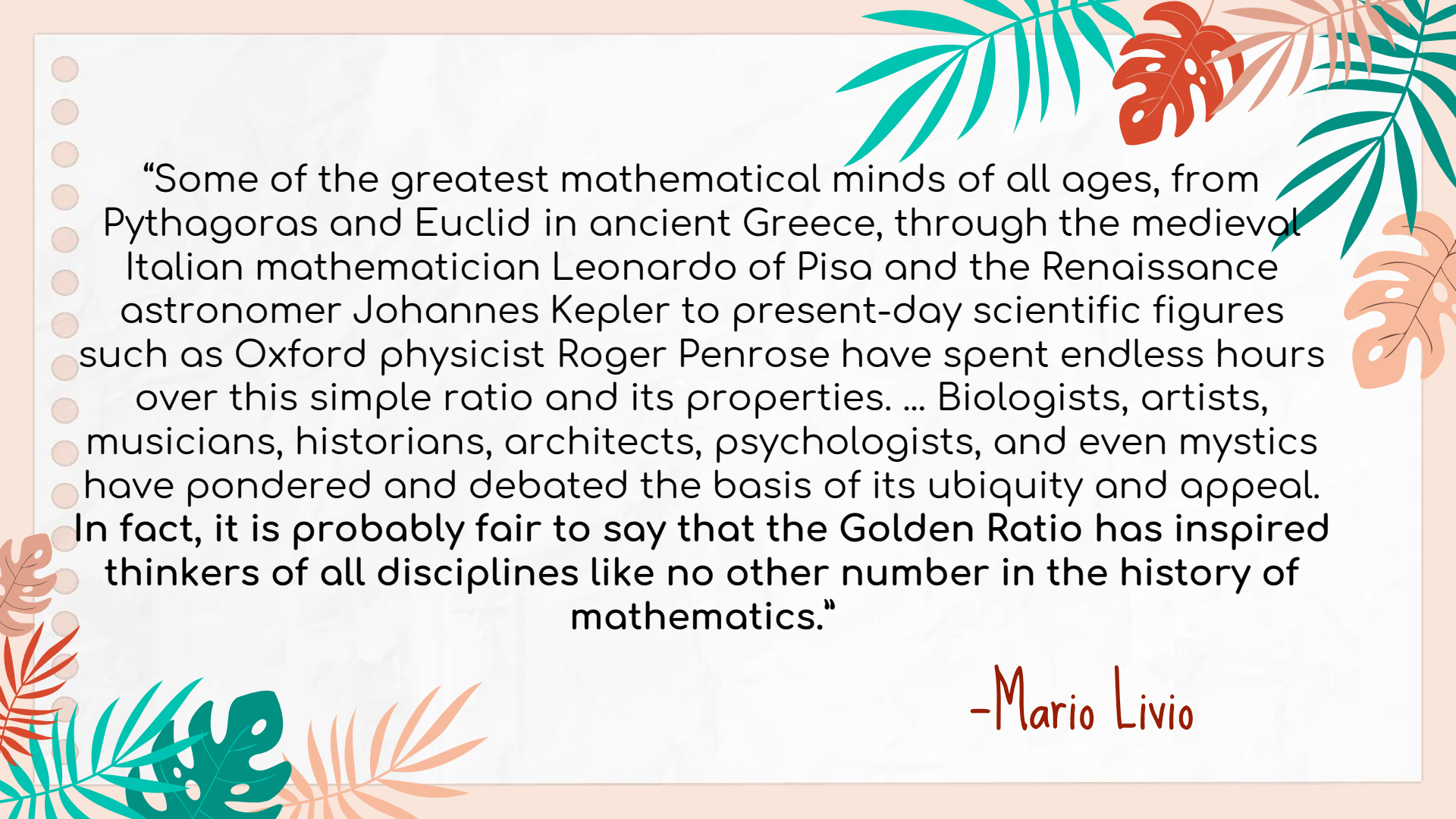


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GEOGRAPHIC



Sizing/cropping images

Logo design



“Some of the greatest mathematical minds of all ages, from Pythagoras and Euclid in ancient Greece, through the medieval Italian mathematician Leonardo of Pisa and the Renaissance astronomer Johannes Kepler to present-day scientific figures such as Oxford physicist Roger Penrose have spent endless hours over this simple ratio and its properties. ... Biologists, artists, musicians, historians, architects, psychologists, and even mystics have pondered and debated the basis of its ubiquity and appeal. In fact, it is probably fair to say that the Golden Ratio has inspired thinkers of all disciplines like no other number in the history of mathematics.”

-Mario Livio

Resources and References

- <https://www.goldennumber.net/>
- <https://slideuplifts.medium.com/learn-the-science-of-proportions-the-golden-ratio-5f6c0f1b576>
- <https://plus.maths.org/content/myths-maths-golden-ratio>
- https://en.wikipedia.org/wiki/Golden_ratio
- <http://www.geom.uiuc.edu/~demo5337/s97b/art.htm>
- <http://www.mcs.surrey.ac.uk/Personal/R.Knott/Fibonacci/fibnat.html>