

4.3

THE SEXIEST RECTANGLE

Finding Aesthetics in Life, Art, and Math Through the Golden Rectangle

Geometry has two great treasures: one is the theorem of Pythagoras; the other, the division of a line into extreme and mean ratio. The first we may compare to a measure of gold; the second we may name a precious jewel.

JOHANNES KEPLER



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Are you into it?

1

QUESTION OF THE DAY:

Imagine the ideal shape that comes to mind when you hear the word “rectangle.”

Draw the shape on the board and initial your rectangle.

Question of the Day

- What conclusions can you come to about the rectangles on the board?

Review of the Fibonacci Numbers

- The following sequence of numbers are called the Fibonacci Numbers:

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, ...



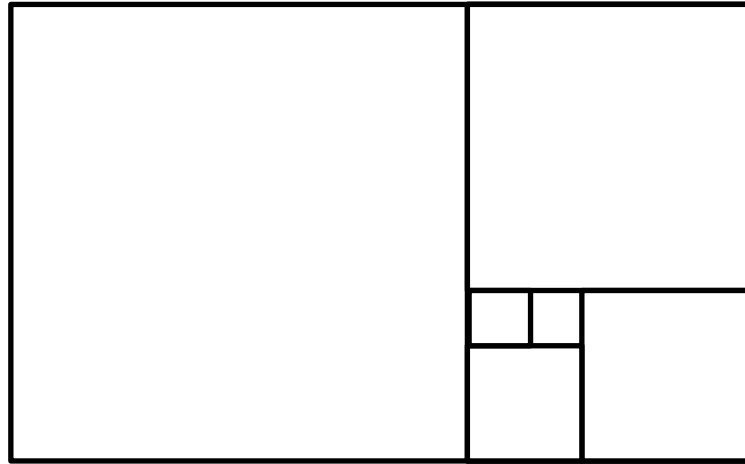
What is a Golden Rectangle?

- Golden Rectangle – any rectangle having a base b and height h such that



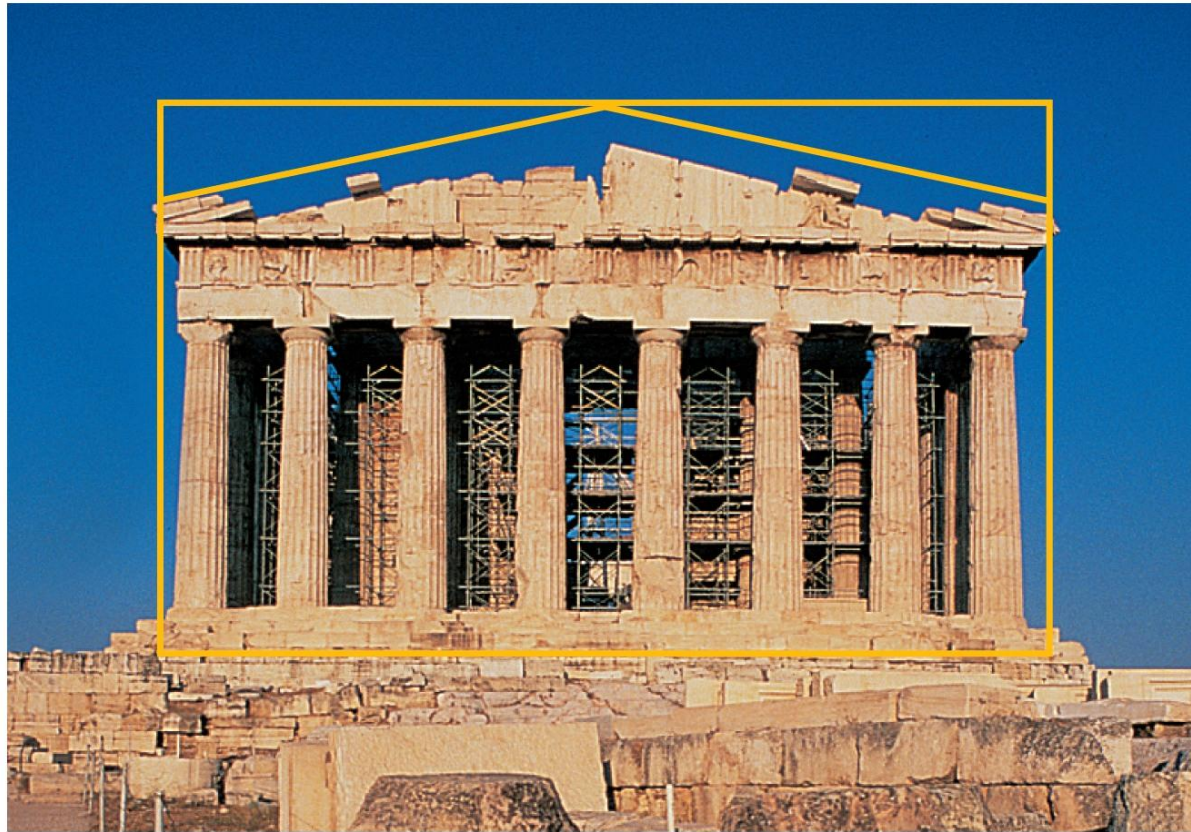


The Golden Rectangle Within a Golden Rectangle



If a Golden Rectangle is divided into a square and a smaller rectangle, then the small rectangle is another Golden Rectangle.

The Golden Rectangle in Greece



Archivision/Masterfile

Archivision/Masterfile

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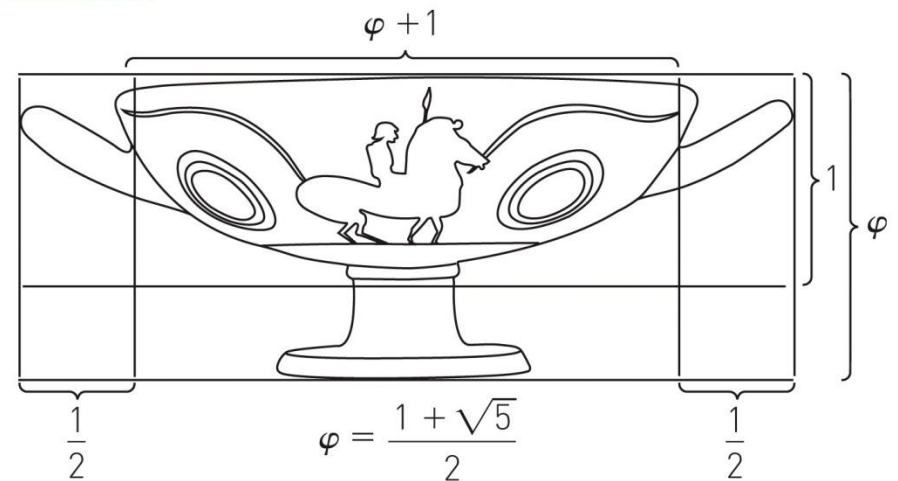
Parthenon in Athens, built in the 5th century BCE.

- The Grecian Eye Cup

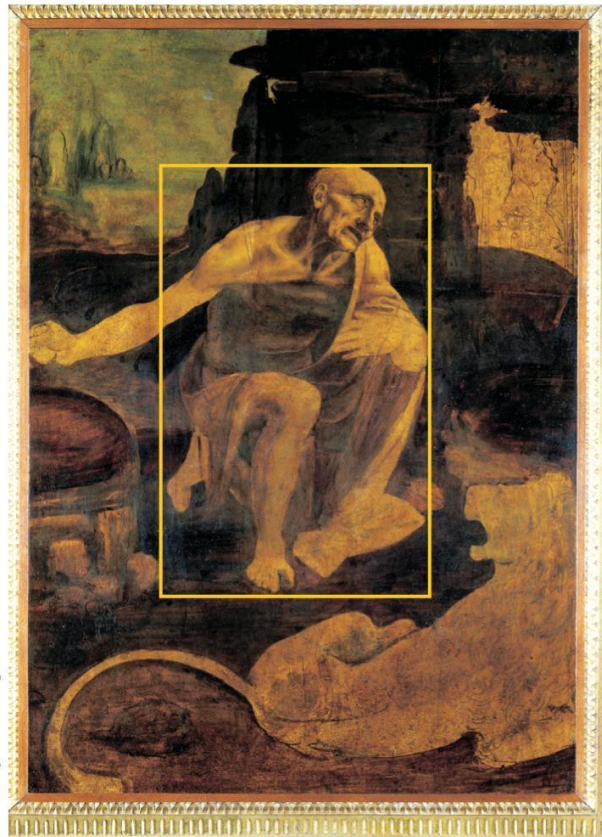


Bohams, London, UK/The Bridgeman Art Library International

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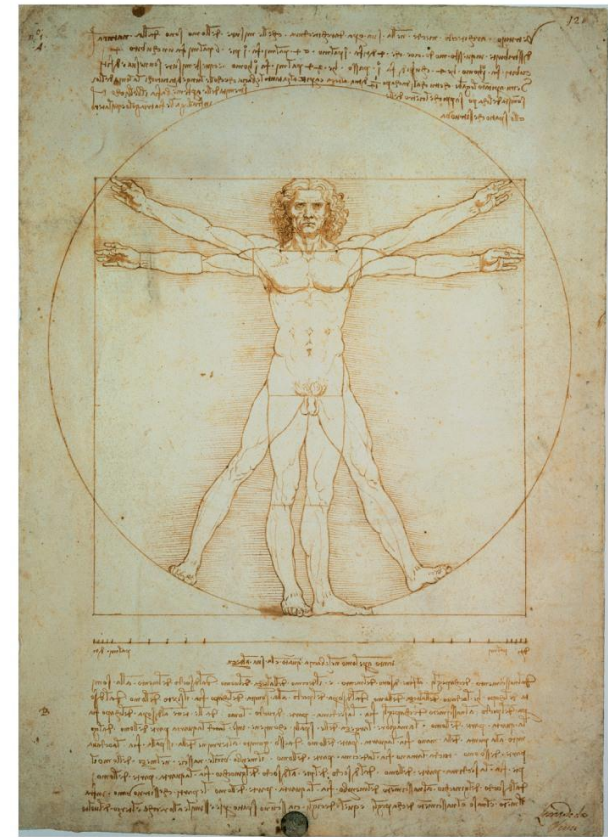
The Golden Rectangle in the Renaissance



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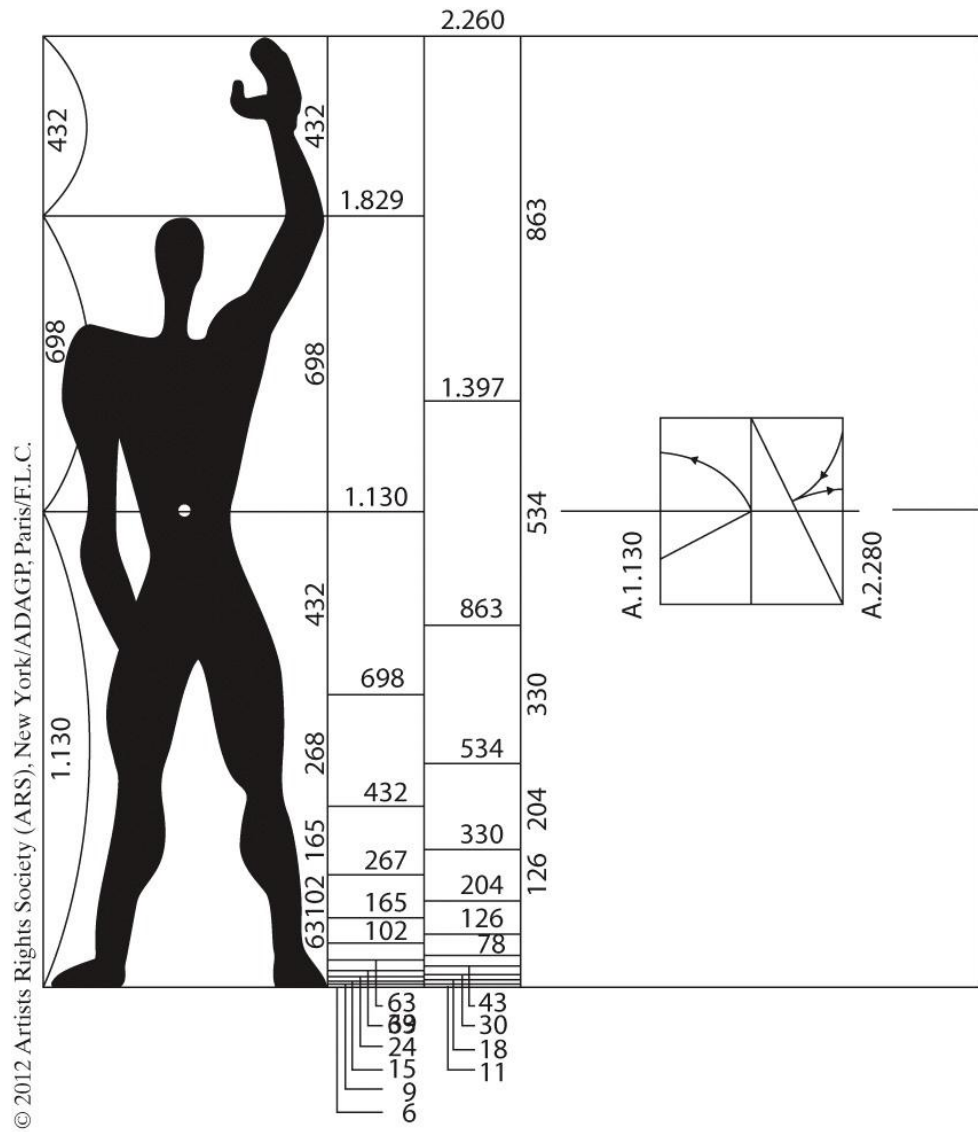
Leonardo da Vinci *St. Jerome*, 1480.



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Leonardo da Vinci illustration for Luca Pacioli's *De Divina Proportione*.

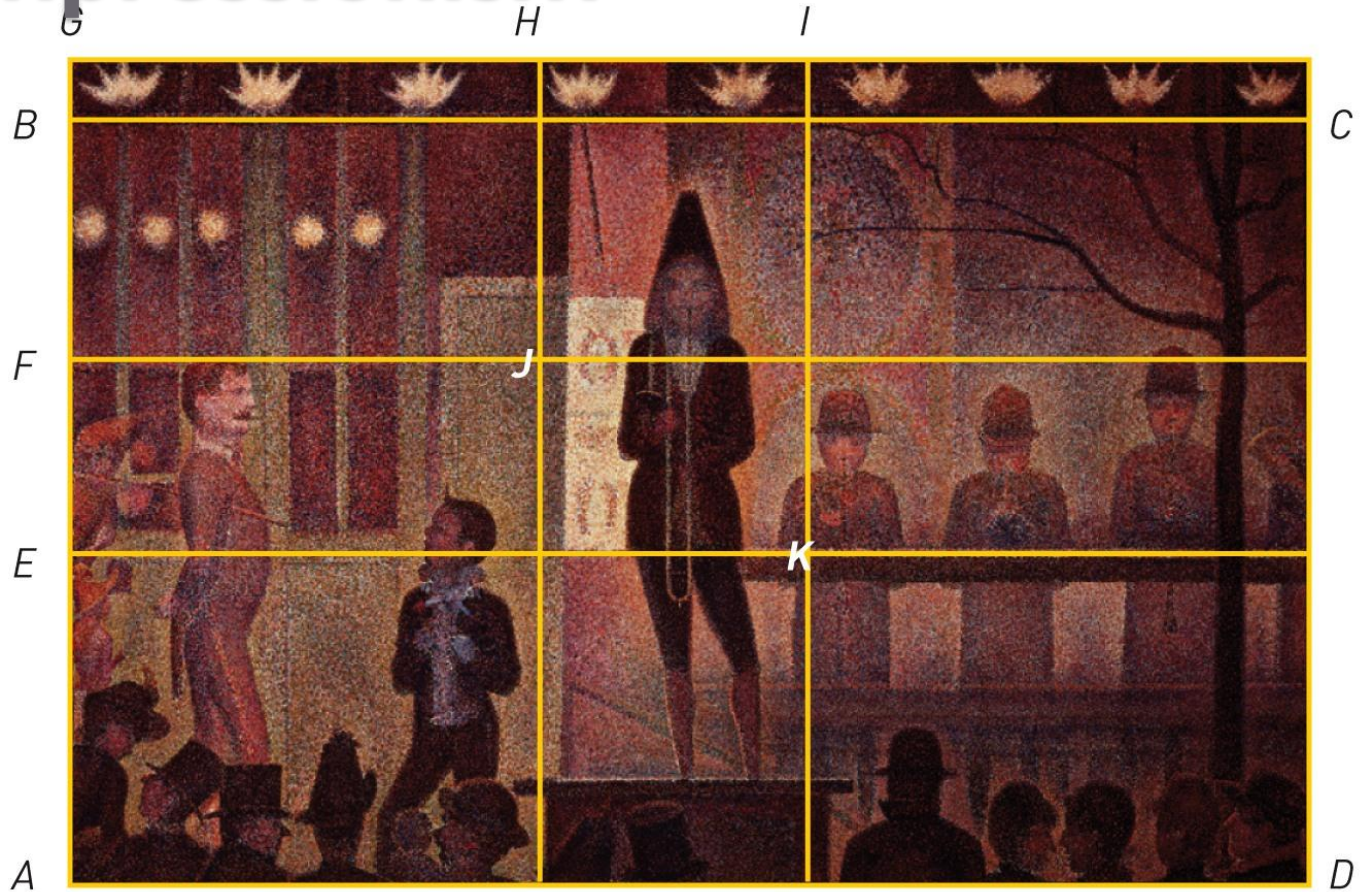


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Le Corbusier's 1946 *Modular Man*

Proportional system: $6+9=15$, $9+15=24$, and so on.

The Golden Rectangle and Impressionism



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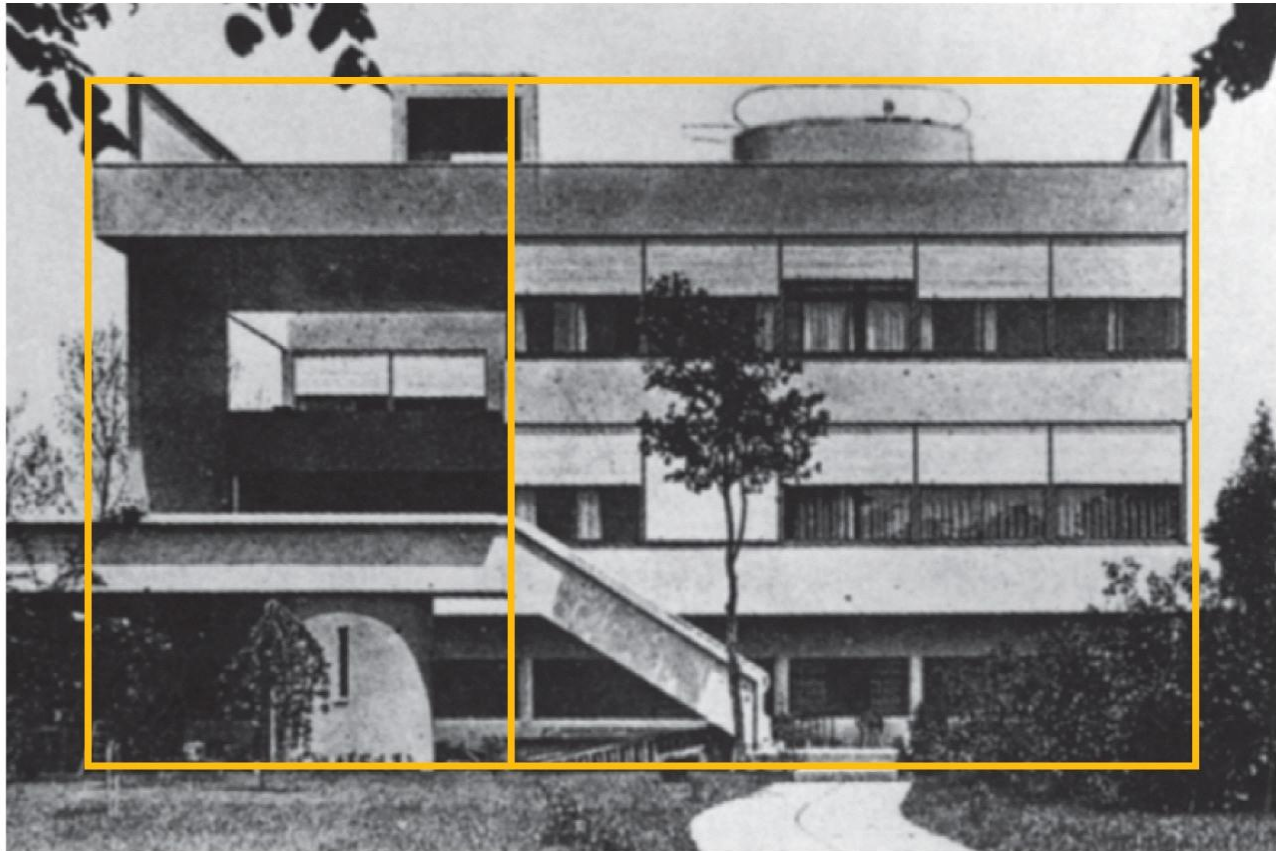
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George Seurat's *La Parade*, 1888

$ABCD$, $FGHJ$, $EBIK$ are all golden rectangles; we also note that $\frac{GE}{EA} = \frac{EA}{FE} = \varphi$

The Golden Rectangle in the 20th Century

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Villa designed by French artist Le Corbusier

© dibrova/iStockphoto

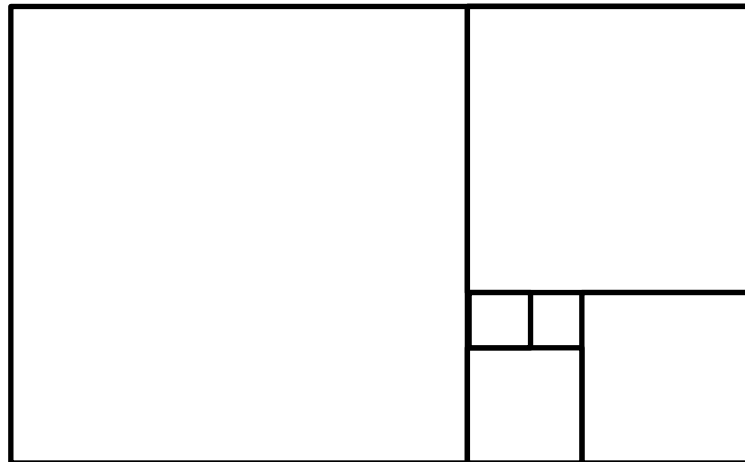


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United Nations Headquarters in New York City

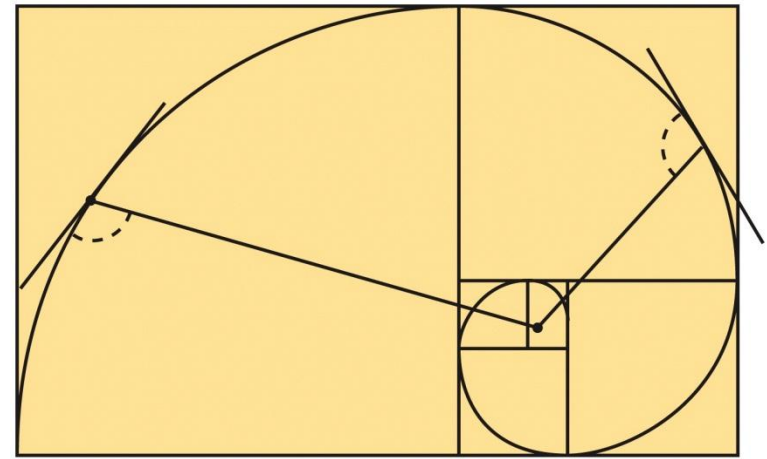
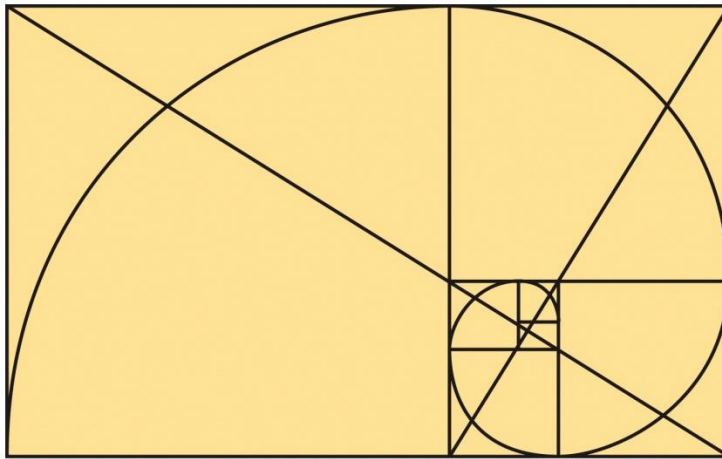
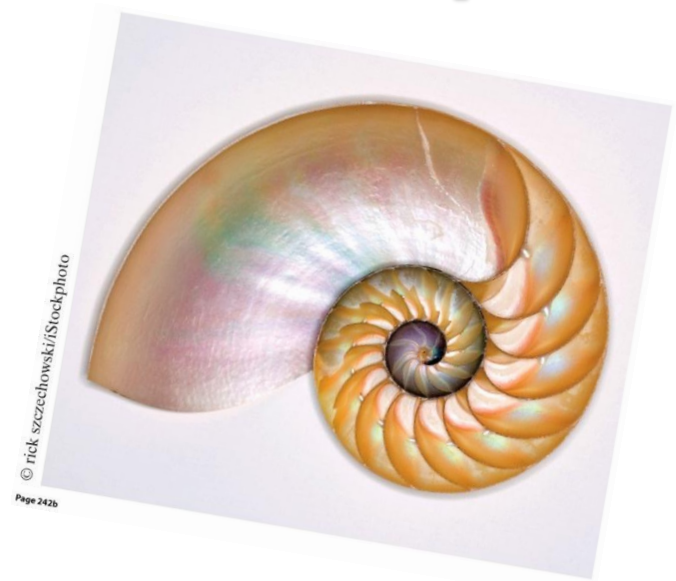
The Golden Spiral

- Take a Golden Rectangle and draw successive squares.
- Within each square, draw a quarter of a circle having a radius equal to the side of the square.
- If we do this, we get a spiral.



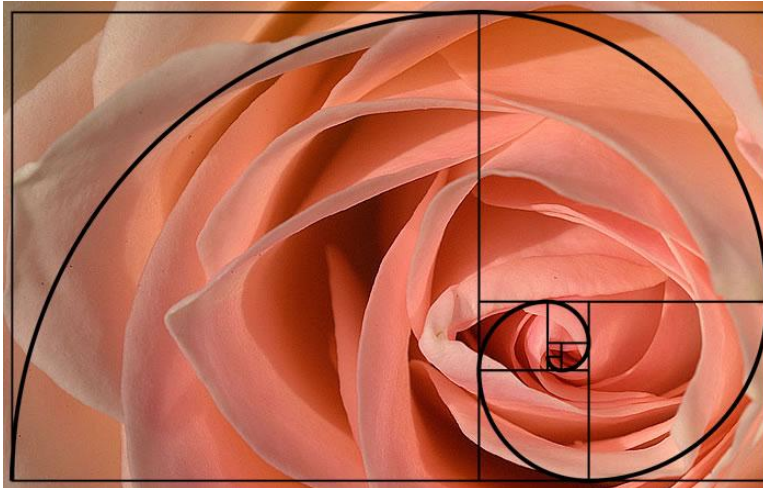
The Appeal of the Golden Spiral

- Logarithmic Spiral
- Miracle Spiral
- Equiangular Spiral

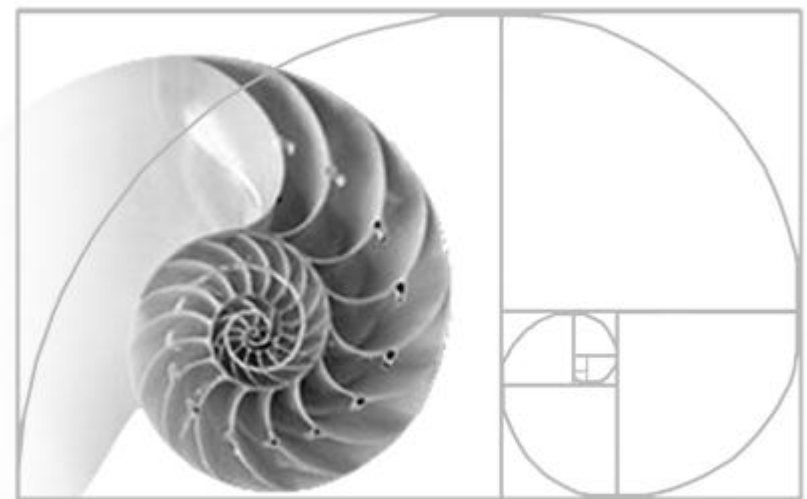
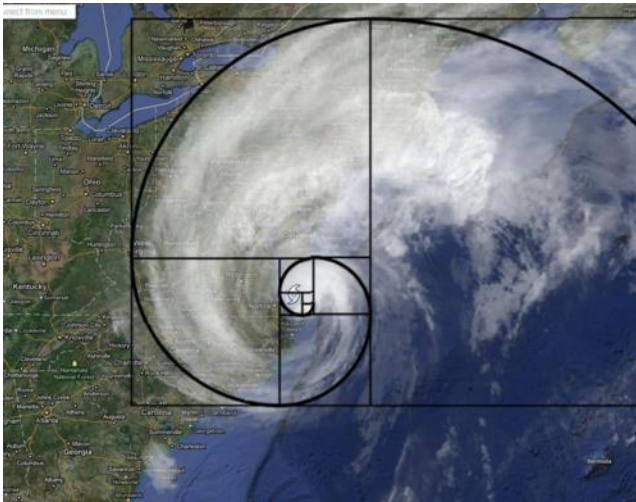


The Golden Spiral & Photography

- The main application to photography with cameras that make rectangular images is the ratio of the rectangle. As in 1:1.2 although the actual ratio is irrational in practice this ratio will provide the same result. The rectangle proscribed by this ratio of long to short sides is used to frame your composition with the understanding that there is a descending curve which determines where you would focus and compose your image.



The Golden Spiral in Nature



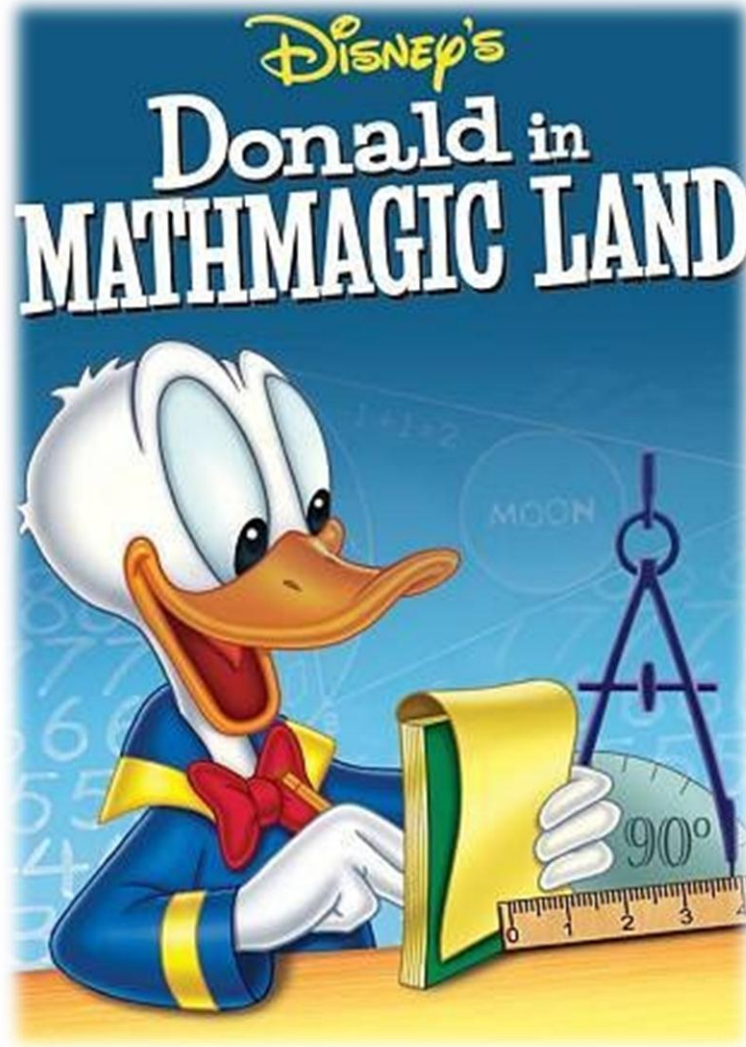
<http://apod.nasa.gov/apod/ap080517.html>

<http://apod.nasa.gov/apod/ap030925.html>

Homework

- Read 4.3 The Sexiest Rectangle pgs. 232-248.
- Mindscapes 4.3 #3, 9, 12, 13, 16, 17, 20
- Famous Mathematician
- The Math Book Presentation

Donald in Mathmagic Land



Homework

- Write a one to two page summary on Donald in Mathemagic Land.
 - Refer to the bottom of your Homework Sheet for writing assignment instructions.
- Famous Mathematician
- The Math Book Presentation

Resources

- <http://digital-photography-school.com/forum/composition/178411-using-golden-spiral-frame-shots.html>
- <http://www.fabiovisentin.com/blog/45.ashx>
- <http://apod.nasa.gov>
- <http://bcs.wiley.com/he-bcs/Books?action=index&bcsId=7801&itemId=1118156595>