Architecture

Reedy Creek Middle School

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Guest Speakers

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- IBI Group
  - an architecture & engineering company in Raleigh

What is Architecture?

- The art *or* science of building, *specifically:* the art or practice of building structures and especially habitable ones. – Merriam-Webster.

- The art *and* science of building

Art *and* Science

What do Architects do?

- Interpret people's needs into buildings
- Creative design & problem solving
- Draw:
  - freeform sketch
  - computer drafting
  - digital imaging
- Model Building
- Technical Writing
- Help get people's building's built

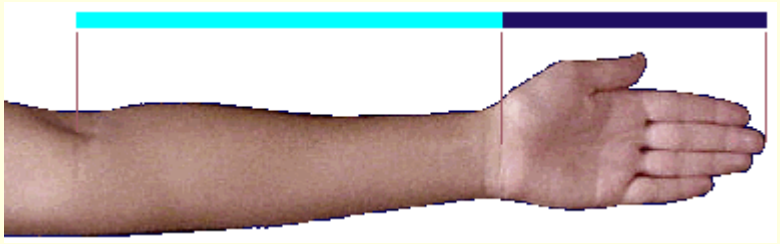
Are Architects good at math?

- Can you add, subtract, multiply and divide?
- Can you use a calculator?
- Can you use a computer?

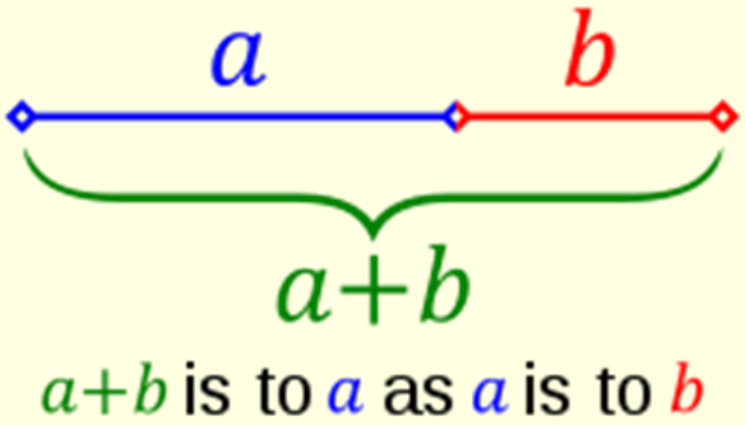
Proportion

- Proportion – harmonious relation of parts to each other or to the whole - Merriam-Webster

- or, The relation of one part to another or to the whole with respect to magnitude, quantity, or degree - Merriam-Webster

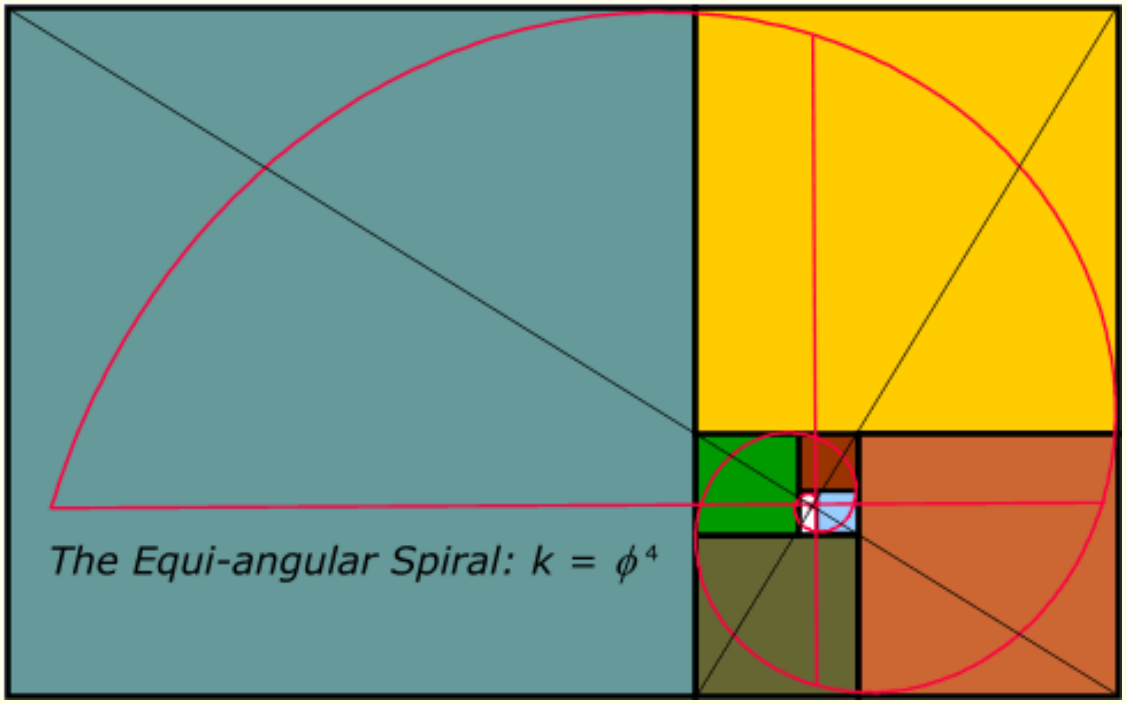


Proportion and Ratio



The **golden section** is a line segment divided according to the golden ratio: The total length ***a* + *b*** is to the longer segment ***a*** as ***a*** is to the shorter segment ***b***.

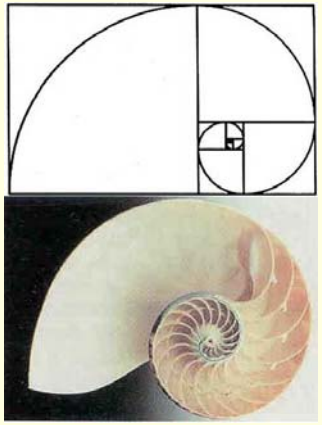
Golden Ratio



Golden Rectangle; Divine Proportion; Mean of Phidias; Golden Section

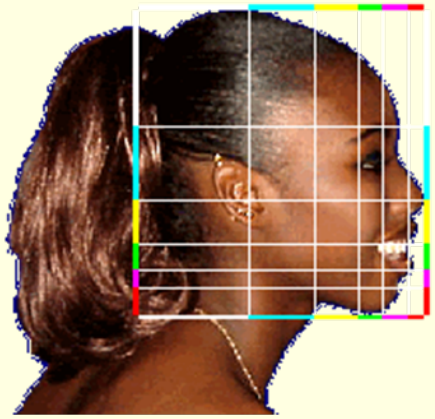
Golden Section

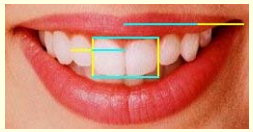
- The Golden Section is a unique Ratio (or relationship between parts) that seems to be preferred by Nature as the best geometry for growth, energy conservation, elegance and has some fundamental relationships to the platonic solids.

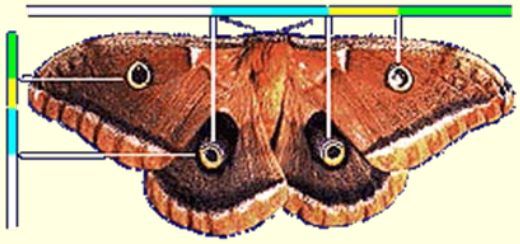


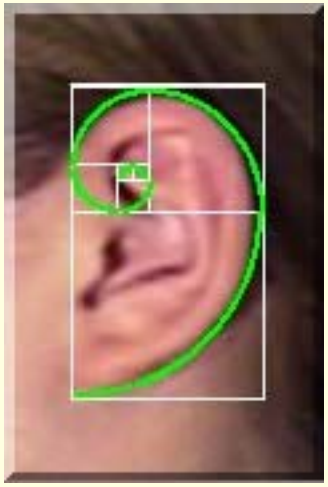
- It was formally discovered by the Greeks and incorporated into their art and architecture, but it has been shown to occur even in prehistoric art, possibly as a function of Man's natural affinity for it's beauty.

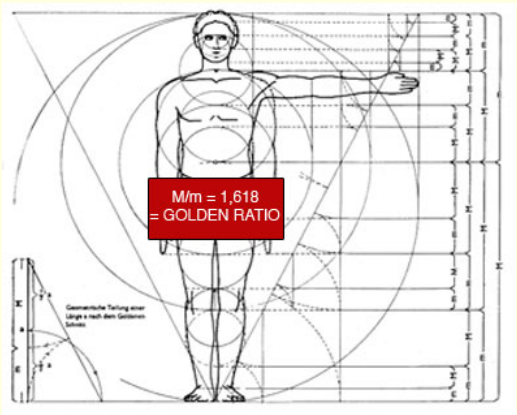
Examples of Golden Ratio 1:1.618

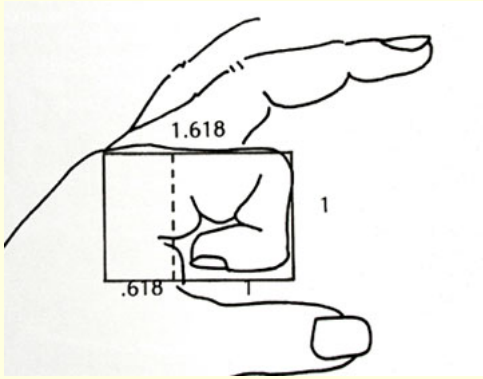












Proportion in Mathematics

- Expressed algebraically:

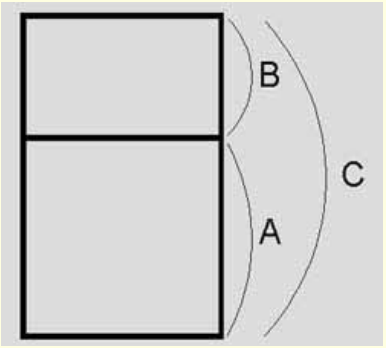
$$\frac{a+b}{a} = \frac{a}{b} = \varphi\,.$$

Φ φ

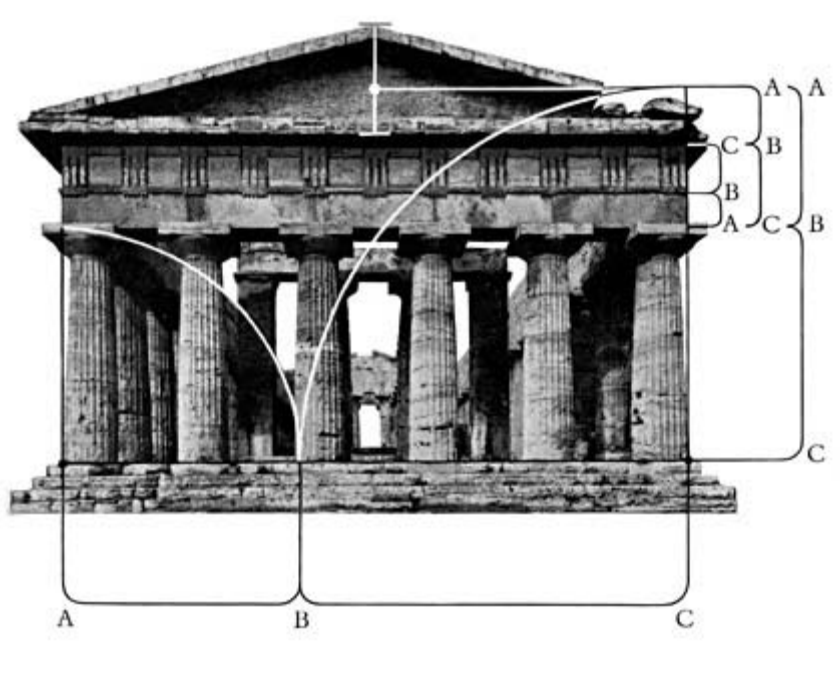
Greek letter Phi

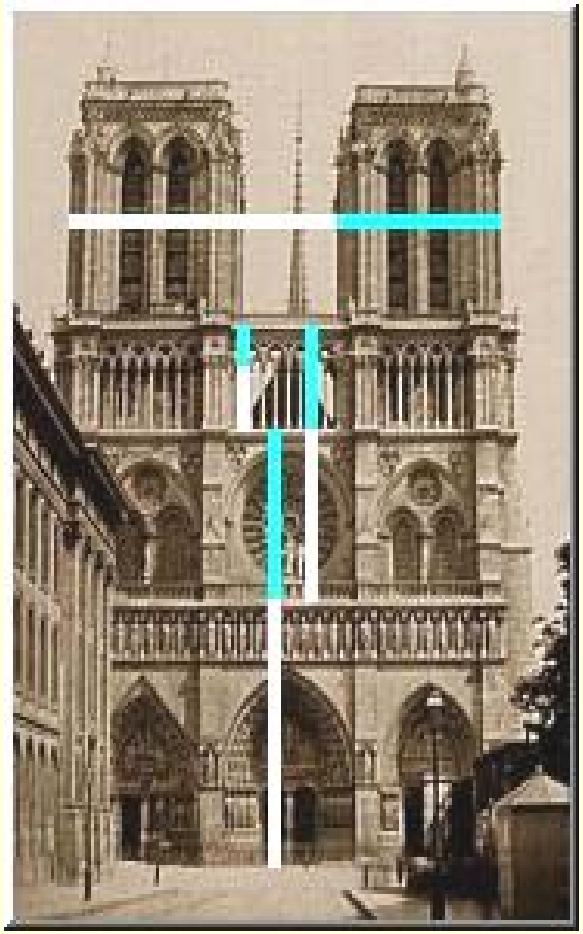
- This equation has as its unique positive solution the algebraic irrational number

$$\varphi = \frac{1+\sqrt{5}}{2} \approx 1.6180339887\ldots$$



Proportion in Old Buildings

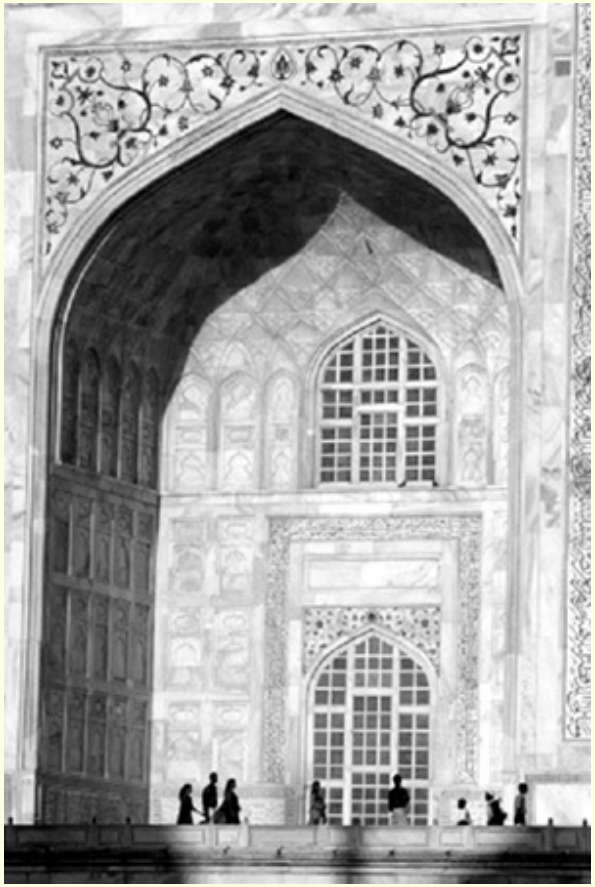




Proportion in New Buildings

Scale

- Proportion refers to mathematical relationships among real dimensions.
- Scale refers to how we perceive the size of things relative to other things.

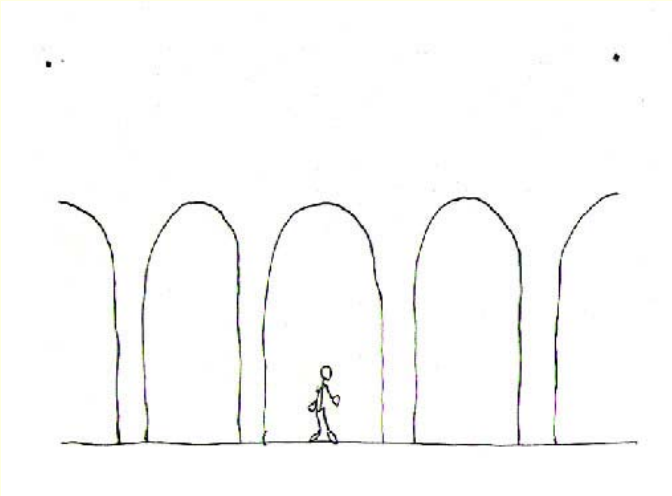


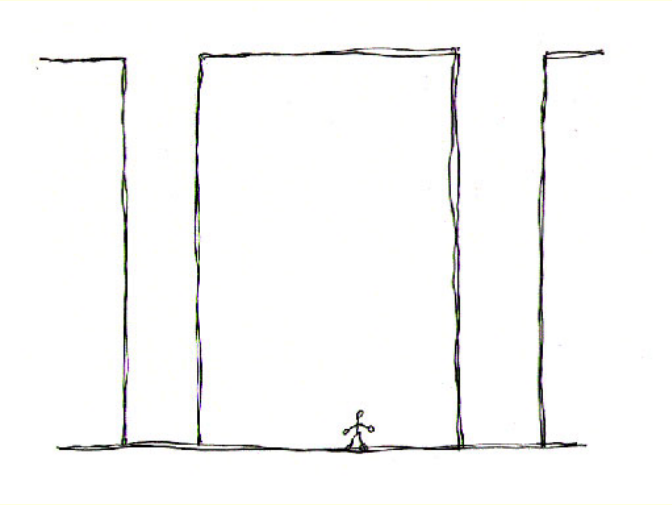
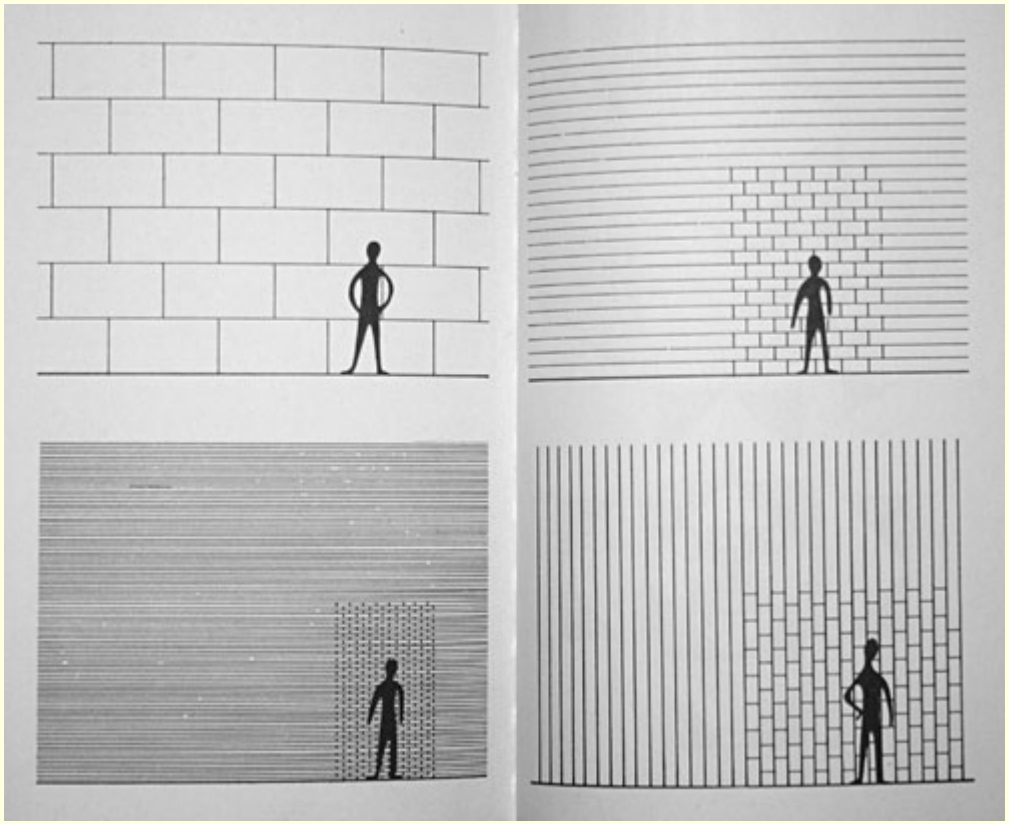
Scale and Perception

Scale and Perception

Scale

- Generic Scale – The size of a building element relative to other forms in its context.
- Human Scale – the size of a building element or space relative to the dimensions and proportions of the human body





Scale of Common Materials