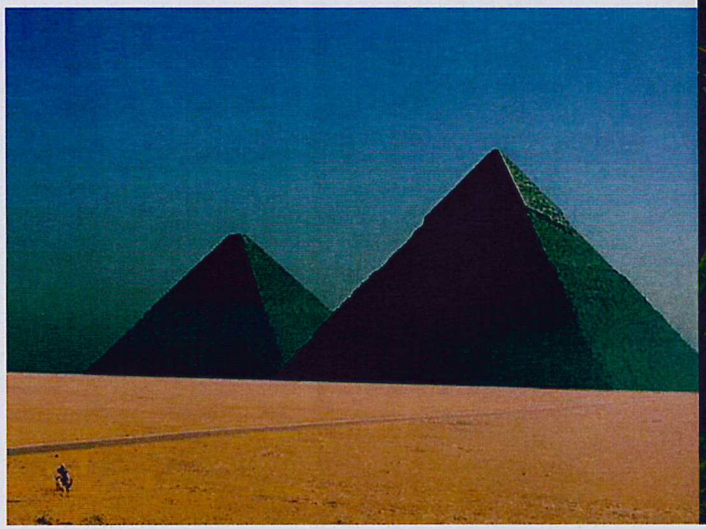
Golden Ratio & Fibonacci Numbers

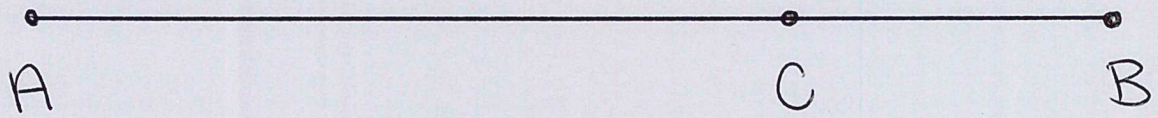


The Golden Ratio

Given a line segment AB, the point C on the line such that the ratio of the length of the line AB to the length of the line AC is the same as

This ratio is known as the *Golden Ratio* and is denoted by the Greek letter ϕ. We have

$$\frac{AB}{AC} = \frac{AC}{CB} = \phi$$



Solutions To Quadratic Equations

An equation of the form:

$$ax^2 + bx + c = 0$$

has solutions

The Value Of The Golden Ratio

The Value Of The Golden Ratio

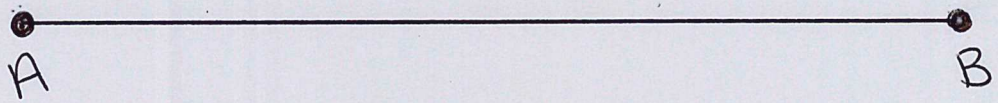
Therefore

$$\phi = \frac{1+\sqrt{5}}{2} \approx 1.618$$

Note: ϕ is the only positive solution to the equation

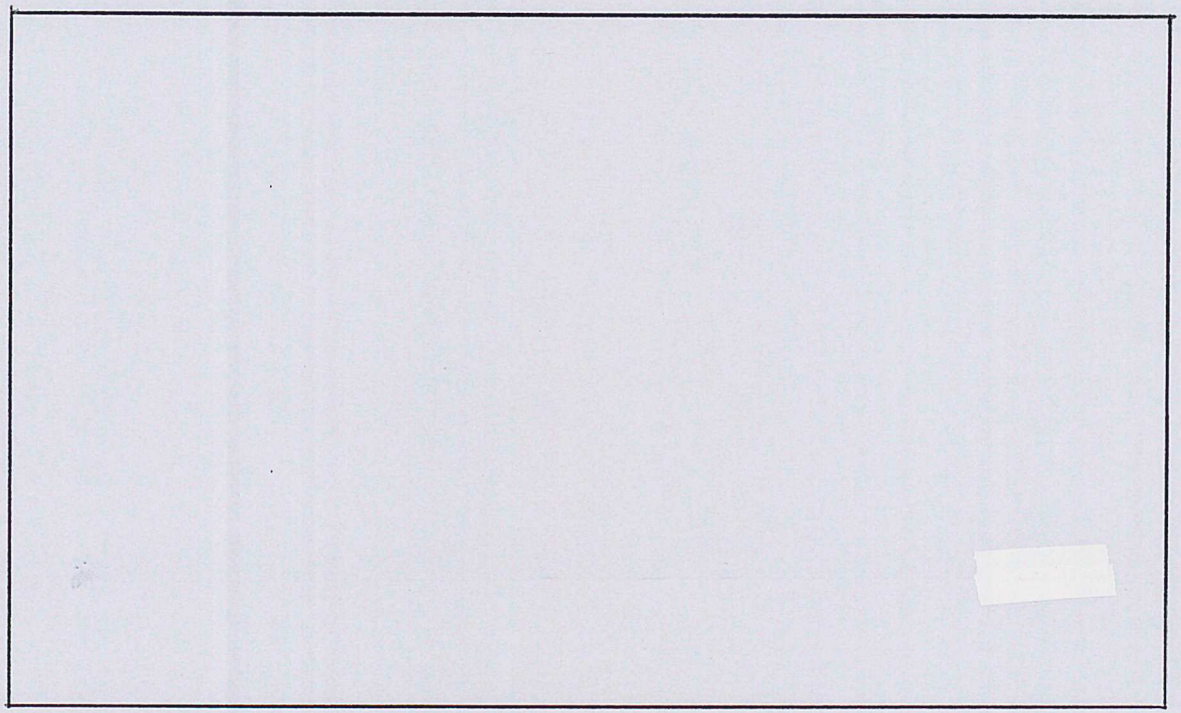
$$x^2 - x - 1 = 0.$$

Construction 1: The Golden Cut

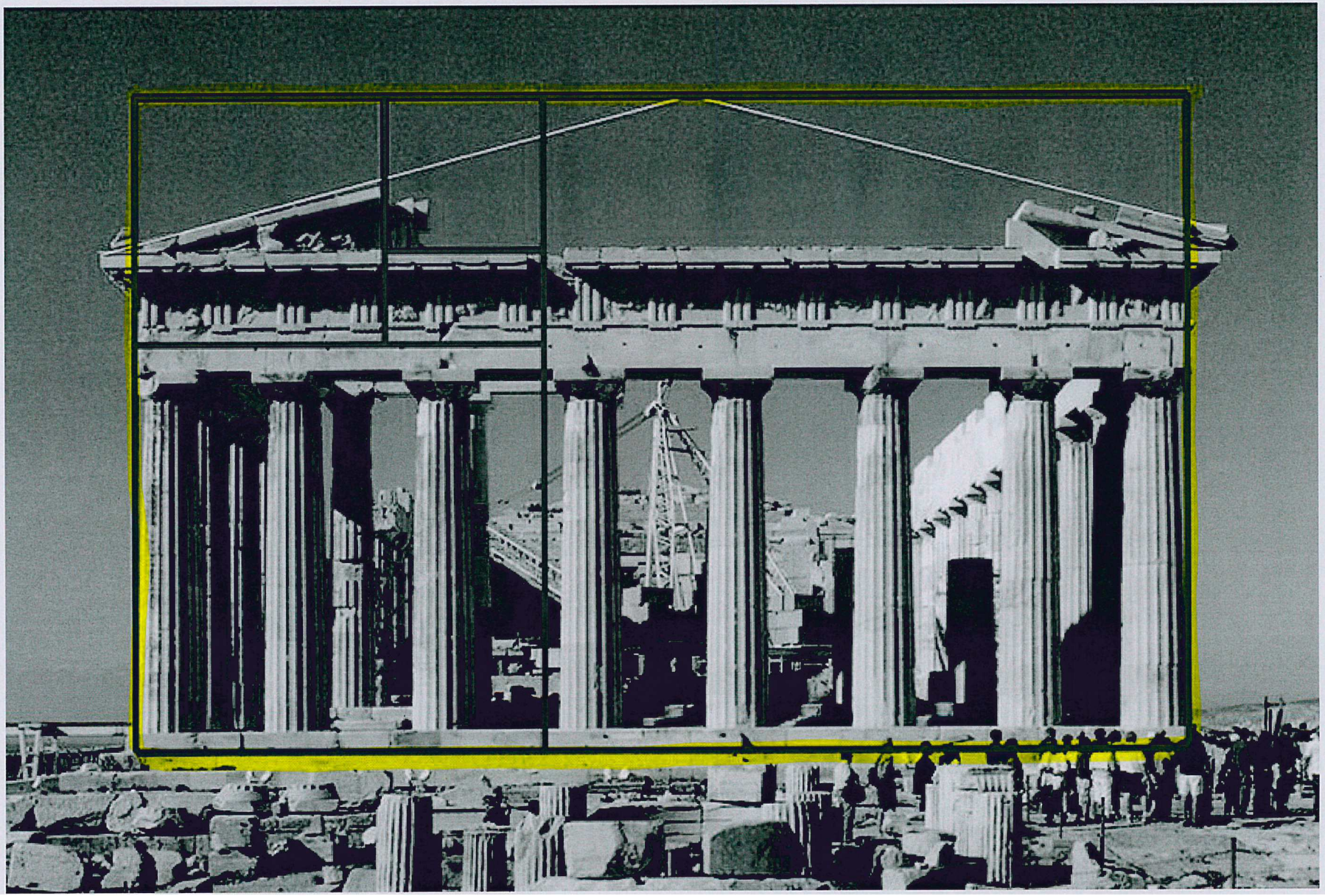


Golden Rectangle

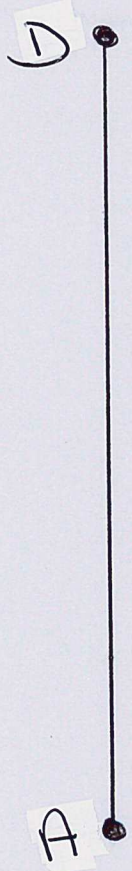
A *Golden Rectangle* is a rectangle that has side lengths that are in *golden proportion*.



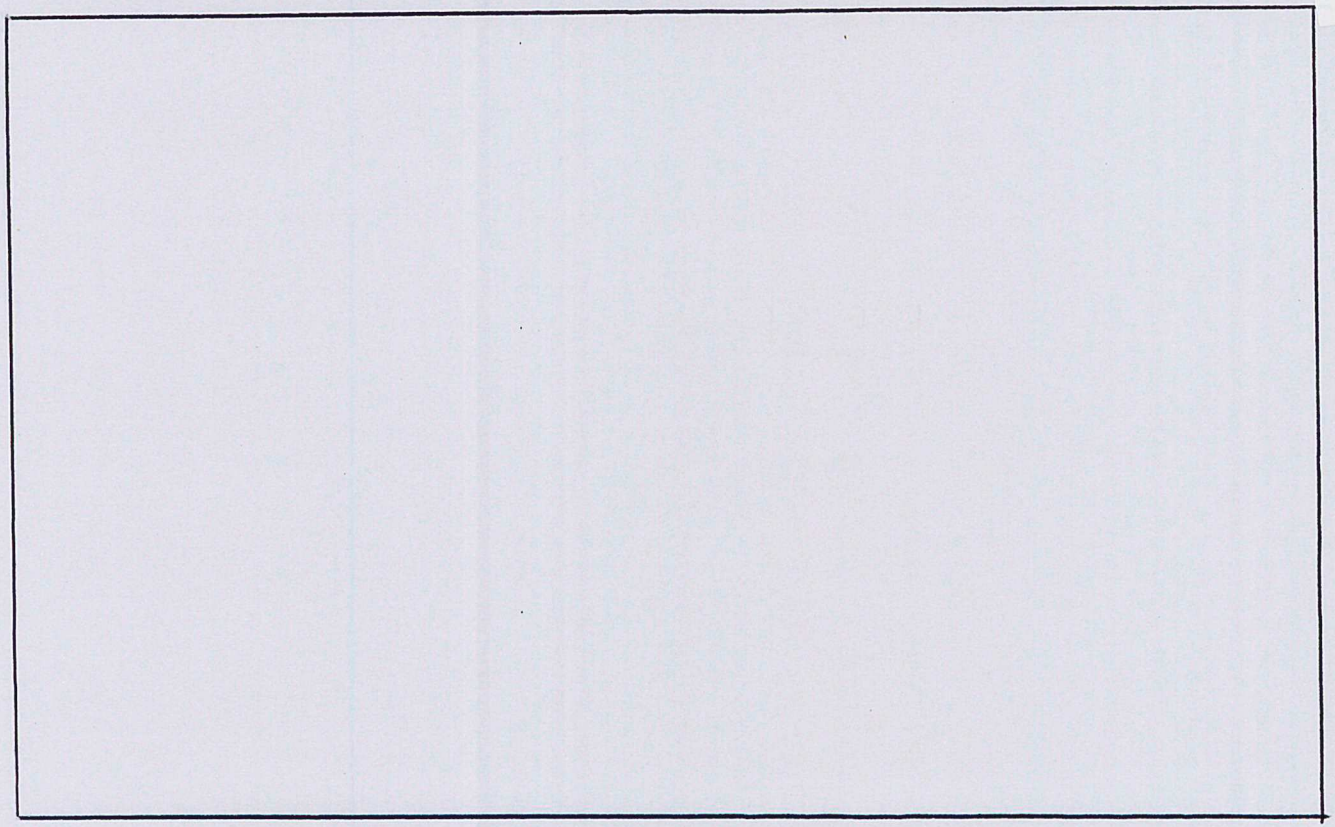
Golden Rectangle: Parthenon, Athens (Built 448-432 BC.)



Construction 2: Golden Rectangle Given A Shorter Side

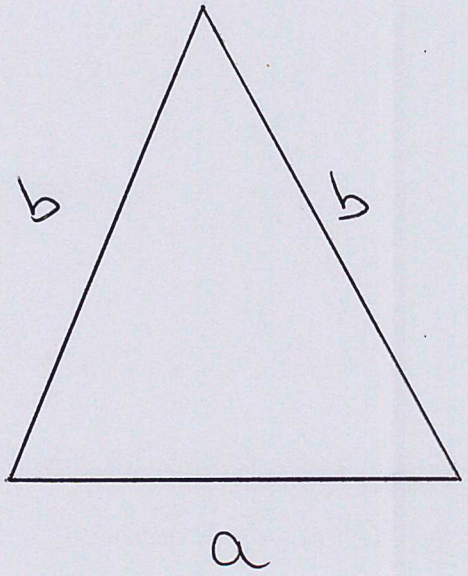


Construction 3: Golden Spiral

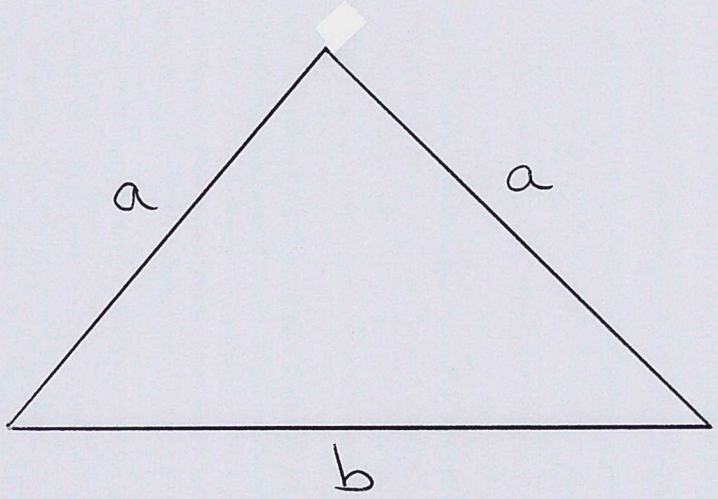


Golden Triangles

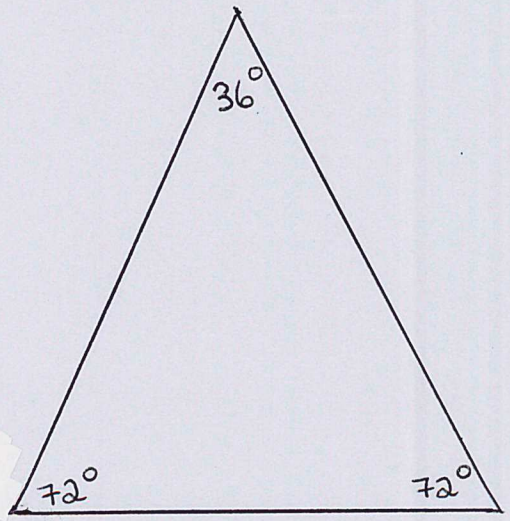
Golden Acute Triangles



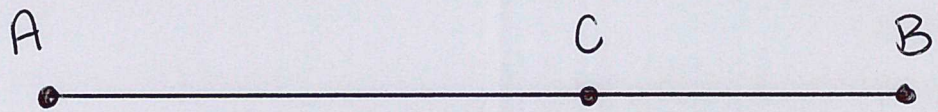
Golden Obtuse Triangles

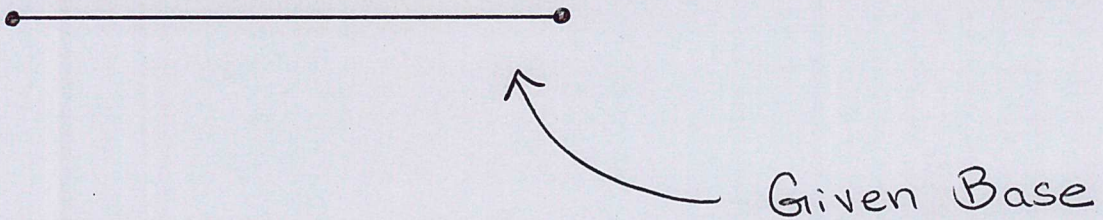


Is This A Golden Acute Triangle?

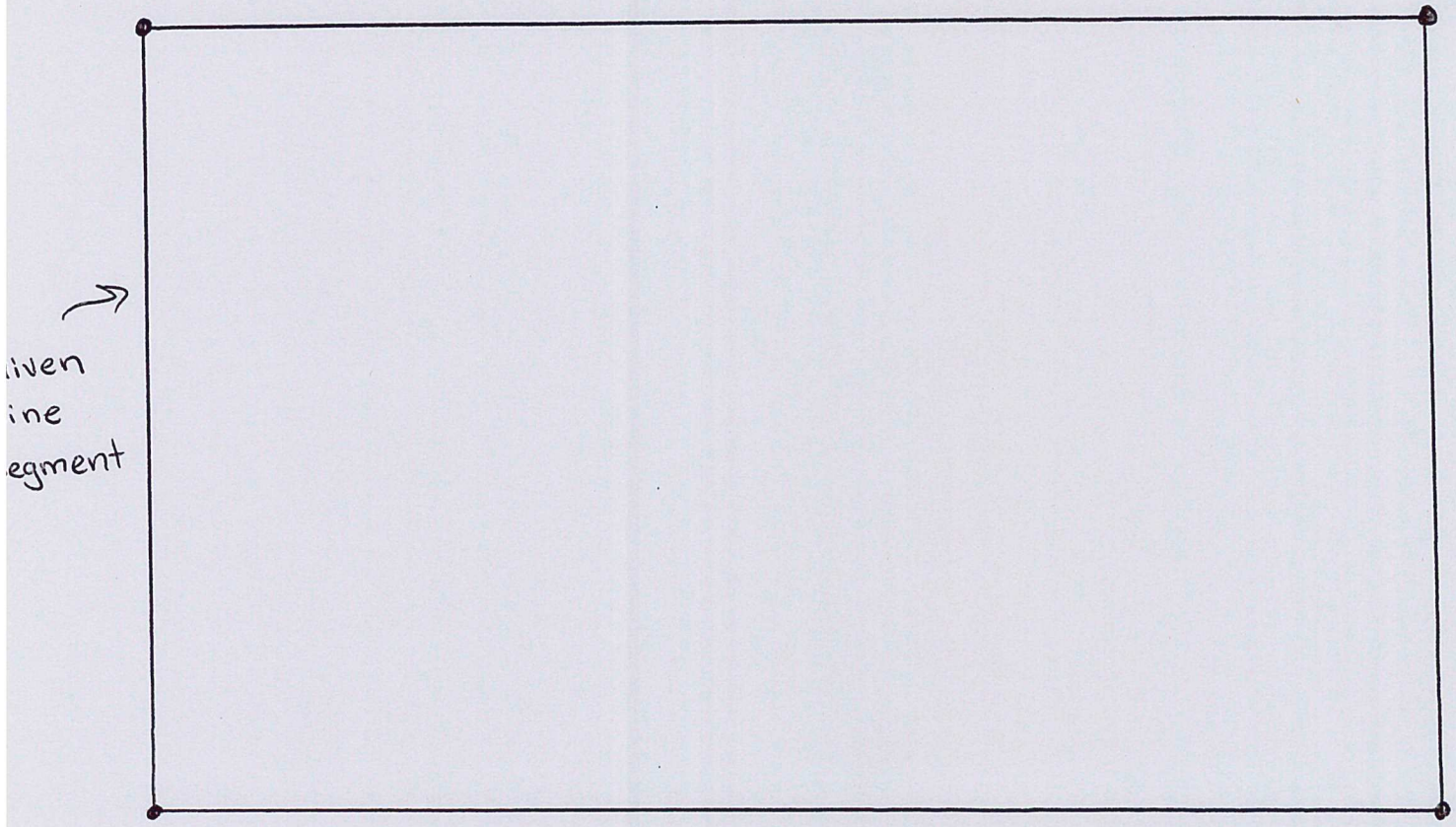


Construction 4: Acute Golden Triangle Over A Given Base

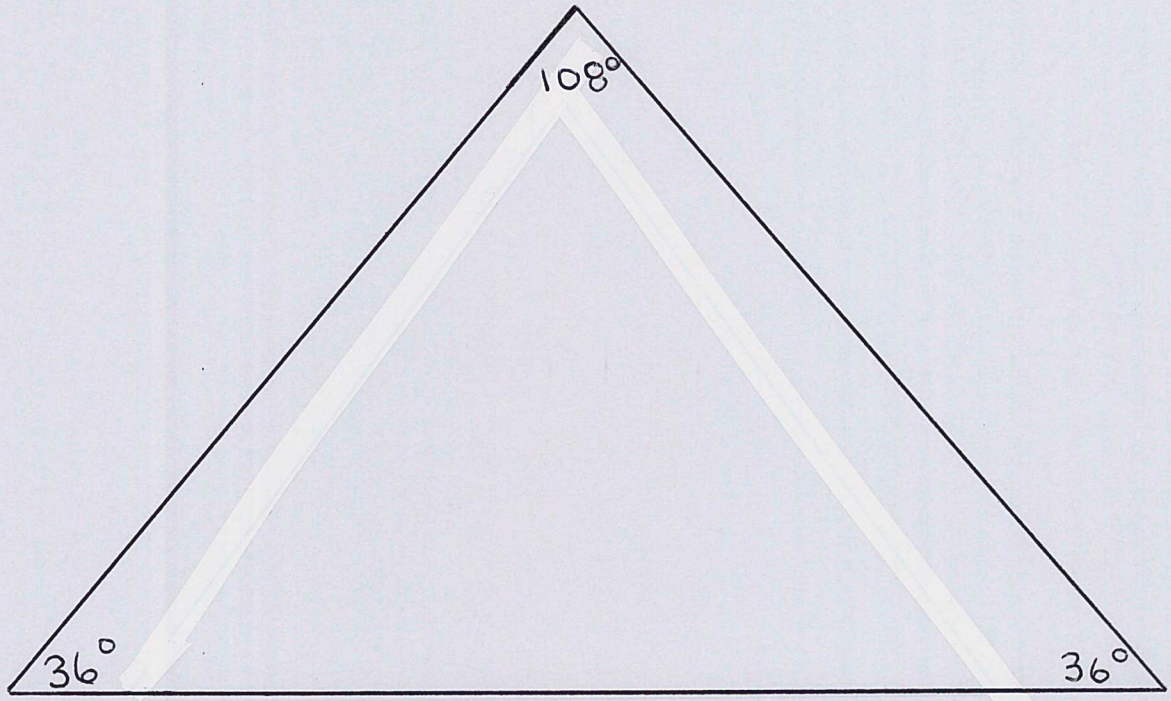




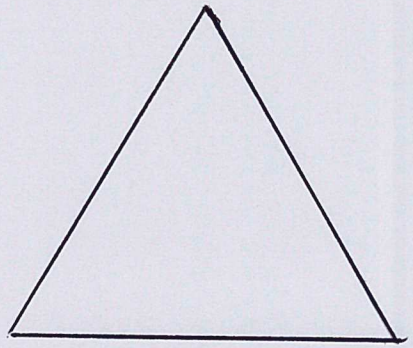
Construction 5: Alternate Construction Of An Acute Golden Triangle Over A Given Base

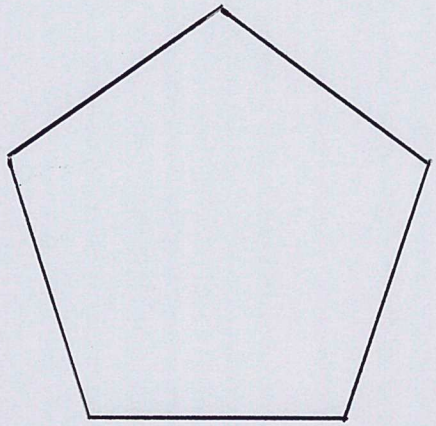


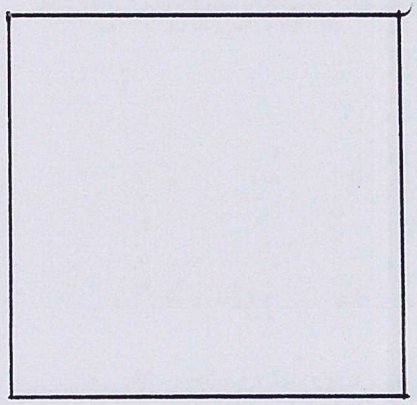
Construction 6: Subdividing An Obtuse Golden Triangle

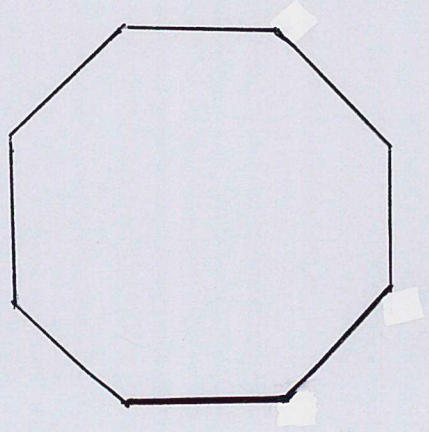


Recall: Regular Polygons

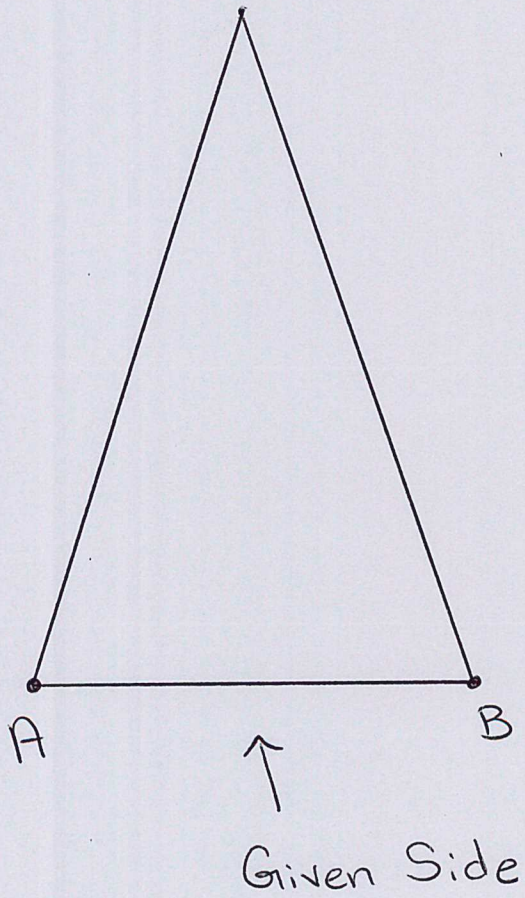


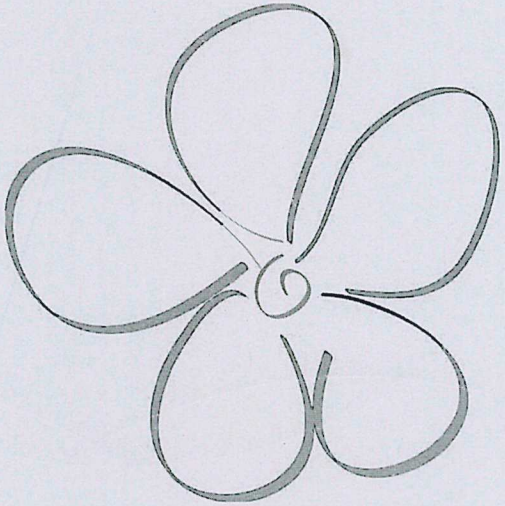






Construction 7: Regular Pentagon Over A Given Side





QUESTIONS???