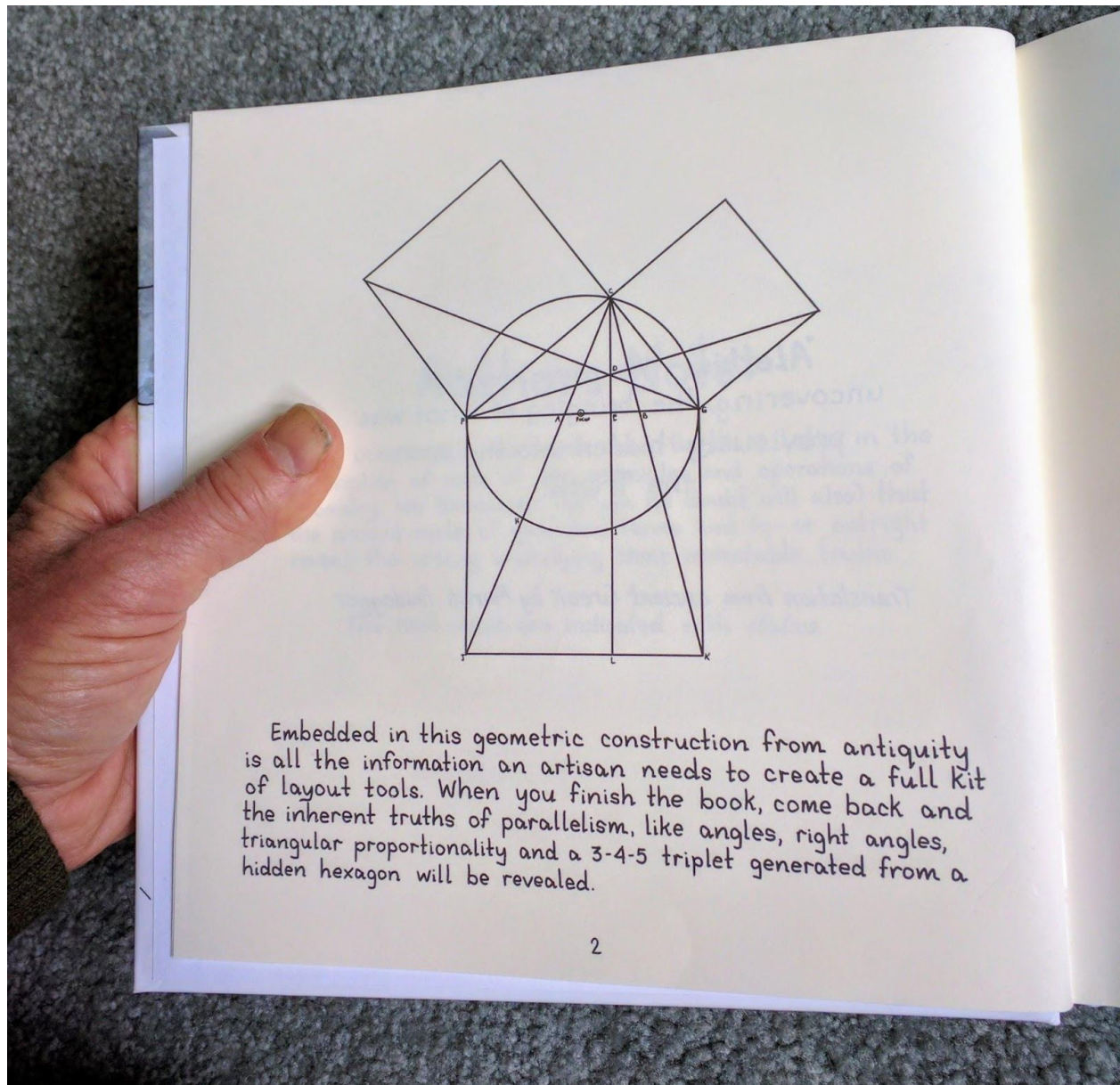
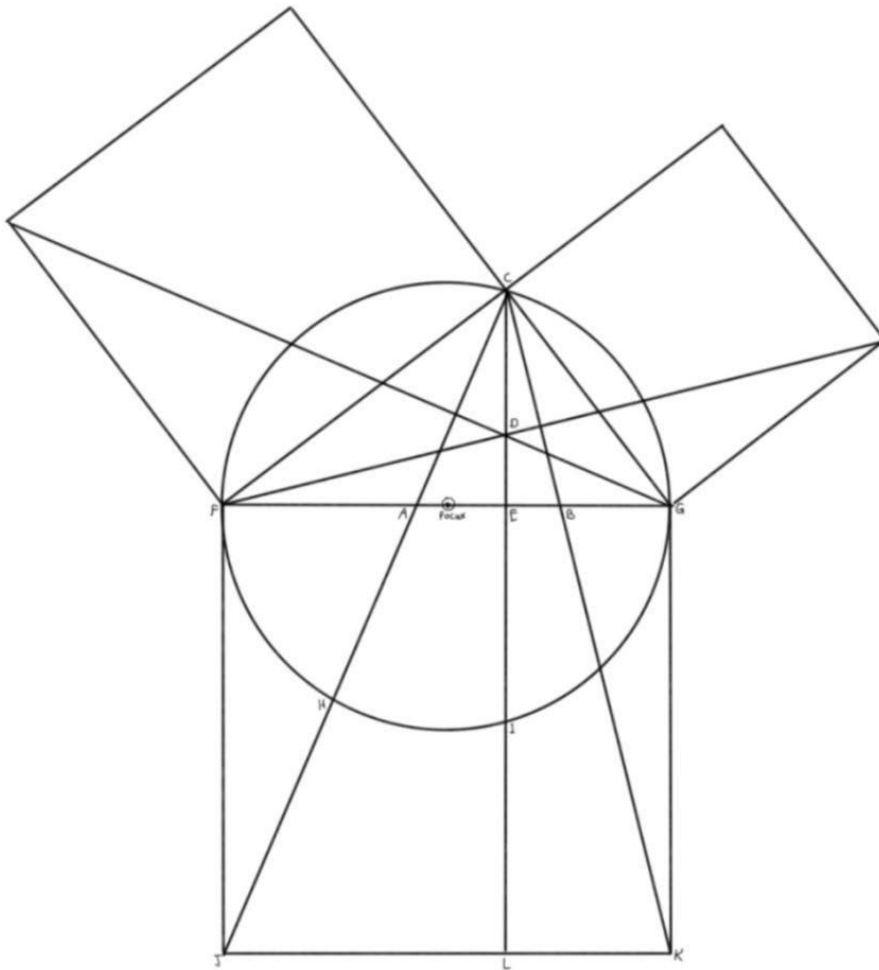


The Hidden Hexagon

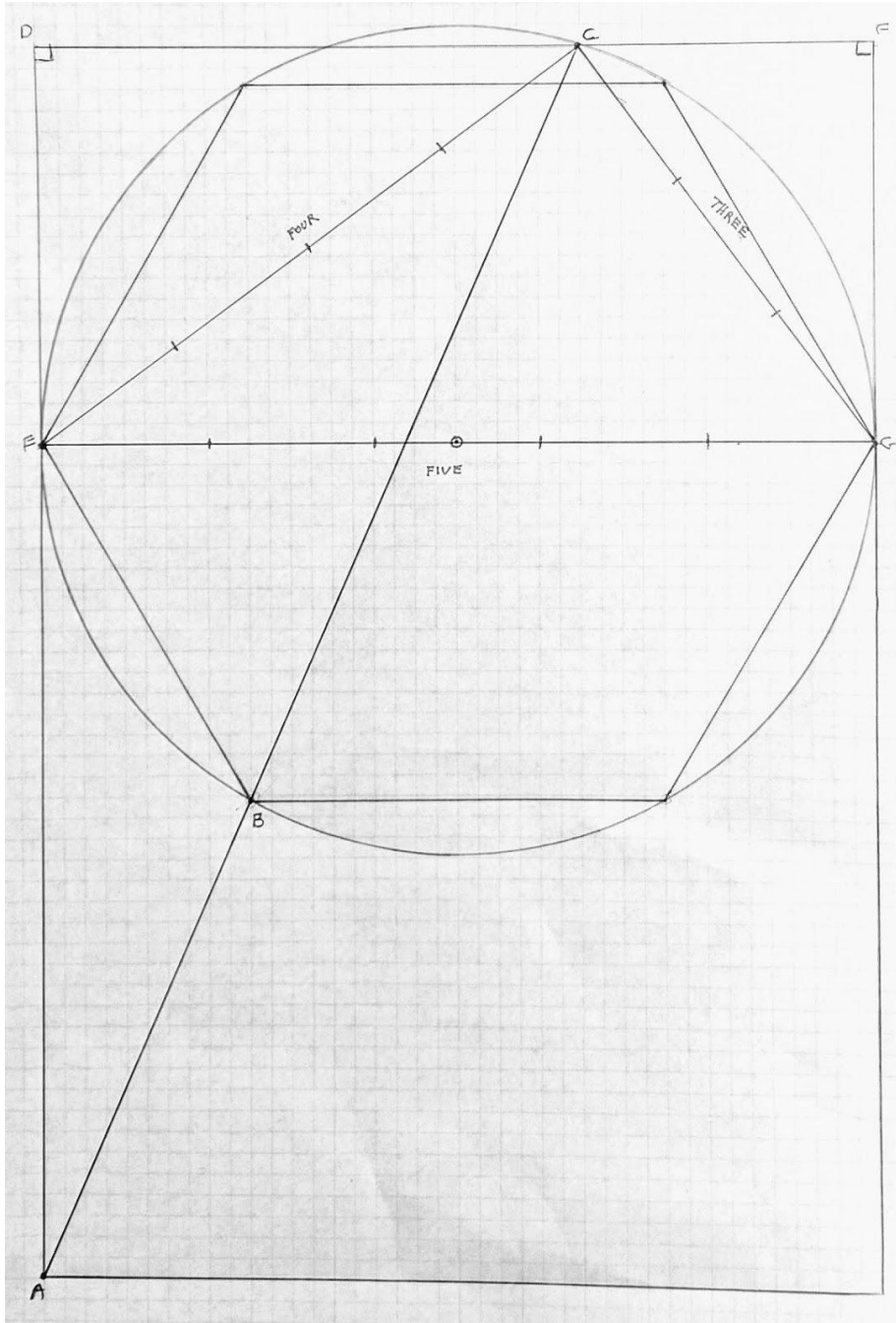
You may remember this page from the introduction to [From Truths to Tools](#):



We've had a few folks ask about the "hidden hexagon" mentioned in the text and we think it's time to share the answer with everyone. This also means revealing a little bit more about what is going on (and not going on) in this geometric construction.



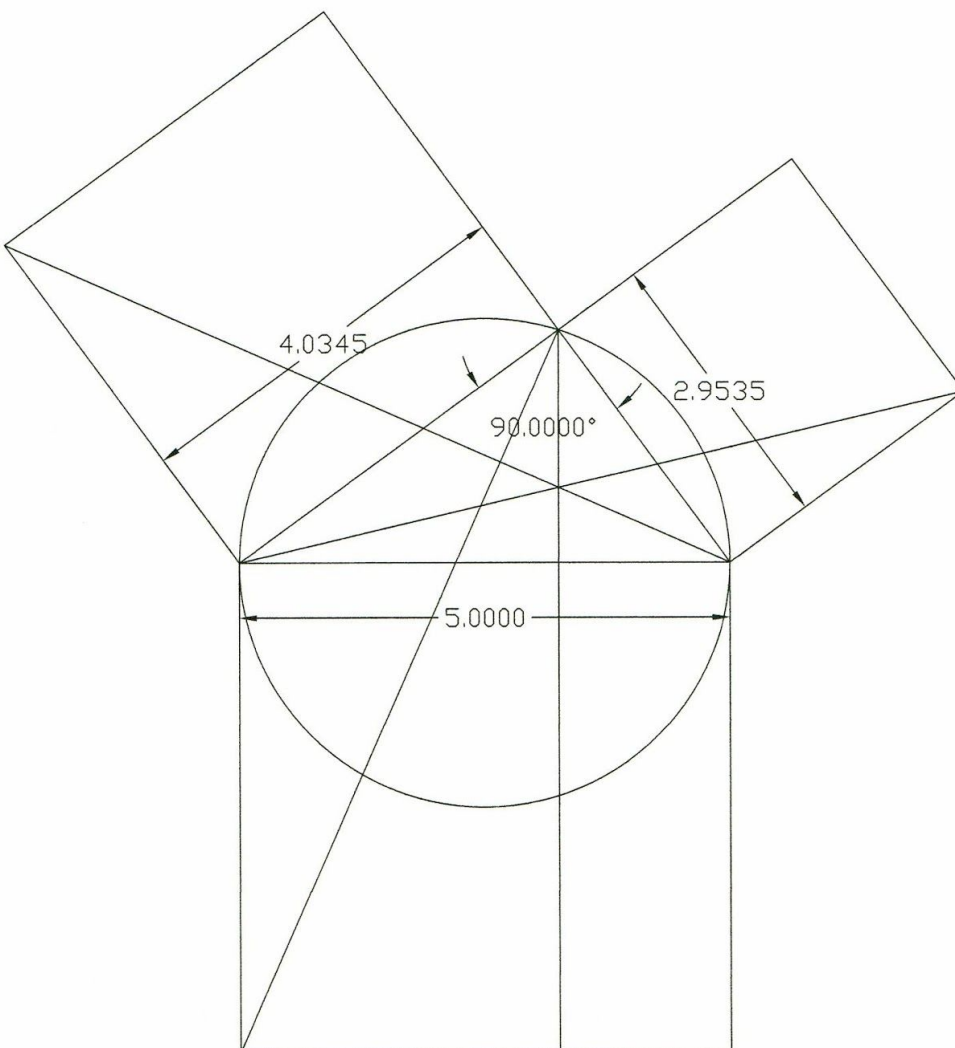
What *is* going on is this: Drawing lines from and through certain points seems to magically create a representation of one of the most important, not to mention useful, theorems for artisans in geometry: the Pythagorean Triplet. In the geometry of this particular interaction of a circle with a square, a triangle is formed in the upper half of the circle whose legs go on to generate a pair of squares that, when their areas are added together, equal the area of the lower square--and they do that in what looks to be a simple triplet ratio of leg lengths of three to four to five.



To arrive at the correct root lengths of the upper two squares to make this simple ratio happen, the trick from antiquity is to generate a hexagon inside the circle (by stepping the radius of the circle around its circumference) and to then draw a line from the lower left hand corner of the lower square through the vertex of the closest hexagon facet. Next, you continue the line

to intersect the upper portion of the circle. This provides the point to which you then draw the legs of the triangle.

The results are leg length relationships of three segments to four segments to the five segments of the diameter line. We have just revealed the simplest of the countless Pythagorean triplets. But have we really? The answer is: almost but not really.



We had our friend Dr. Francis Natali take a look at it, and after a couple pages worth of quadratic equations, the truth was outed: the whole number relationship just isn't there--though it is, inexplicably, amazingly close. Another friend, Kit Africa, generated the drawing above via CAD, also revealing an oh-so-close 3-4-5 triplet. The bottom line: this drawing from antiquity is apparently symbolic: It celebrates the interaction of easily generated shapes that allowed artisans to easily and intuitively design and build beautifully proportioned and aligned forms on the principles of simple plane geometry.