

The Ancient Square and Compass As Defined by the Pentagram and Sacred Geometry

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Sacred Geometry

The pentagram, the 5-pointed star, is a very important symbol in Masonry, and is completely missing from both the rituals of three degrees of Freemasonry and in the tools used in those degrees. Its purpose and use seems to be a “secret” lost in Masonry.

The pentagon is the only two-dimensional regular 5-sided polygon. It can be said to be the basis of “Sacred Geometry.” It was the “secret symbol” of the schools taught by Pythagoras in ancient Greece. [1,2] The angle between each vertex is $360 / 5 = 72$ degrees.

The pentagram is the only two dimensional regular 5 pointed figure, or star, that can be constructed by connecting every other point in a pentagon. The angle between each arm of the star is 36 degrees, and the angle formed at the bottom of the star to the horizontal is 72 degrees. So the lower triangle would contain $72+72+36 = 144+36 = 5*36 = 180$ degrees.

The pentagram is famous for being one of the few geometric figures that clearly embodies the Sacred Geometry ratio “Phi”. Phi is defined as the number $(1+\sqrt{5})/2$ or 1.618034... The number Phi is also famous for being equal to the ratio of any two adjacent terms in a Fibonacci Sequence. It is also uniquely defined by the relationship $\Phi - 1 = 1 / \Phi$.

Looking for the Ancient Design and A Trip to the UK

I have always been fascinated by the signature symbol of Freemasonry – the Square and Compass. I have always wondered how was the first one designed? What was the angle between the compass points? How thick was the top of the compass? How thick was the square? What was the geometry relating the square overlaying the compass? Where is the “All Seeing Eye?”

I can now answer all of these questions in this paper.

I once traveled on a wonderful trip with a group of York Rite Masons to the United Kingdom during October 14 to November 2, 2003. While there, I was able to spend some time in both the Grand Lodge of England and the Grand Lodge of Scotland. I took a protractor along on the trip to measure the angle made by the outer lines of the compass on the various old Square and Compasses on display, and also from the covers of several older books on display. The results were very confusing – until – I finally noticed that ALL of the older physical square and compasses on display in the Grand Lodge of Scotland were ALL defined by the angle of 72 degrees! This would explain how the original compass design could be represented! By a pentagram!

It also answered why - when looking down directly in front of the outer door of the Grand Lodge of England – there is a very large metallic golden pentagram engraved into walkway!

It did NOT, however, answer any of my other questions.

Long Lost, Now Found

So, the simple geometrical method to construct the “Ancient Square and Compass” was hidden from me for the last 17 years, until I recently read “The Secrets of Solomon’s Temple”. [3] In this book (also available as a PDF file), there is a picture of what I believe the “Ancient Square and Compass” should look like. It is based on a pentagram, easily constructed using only a compass and a ruler, and looking very much like the items that I saw and measured in Scotland!

This paper now presents the steps necessary to easily construct this Ancient Square and Compass.

Construction

Scribe a circle of a given radius. For this paper, I will use a radius of 1 unit. I use Excel to both calculate and to plot the results of the work.

The unit circle is defined as being centered at (0,0).

The lower edge of the square is easily defined as being the lower triangle within the circle, at the points:

(-1,0)

(0,-1)

(1,0)

A pentagram is now imposed onto this unit radius circle. The vertices will be at the points:

(0.000000,1.000000)

(0.587785,-0.809017)

(-0.951057, 0.309017)

(0.951057, 0.309017)

(-0.587785, -0.809017)

(0.000000, 1.000000)

The key to the solution is that all of the rest of the points of the Square and Compass fall on these lines!

The ends of the square are at right angles, and the thickness of the square is determined so that its upper corner is exactly on the horizontal line of the pentagram.

The outer edges of the compass are defined by the pentagram.

The inner edges of the compass are defined to meet at the horizontal line of the pentagram.

This completes the design.

However, in reference 3, the inner “eye” is included, and exactly fits into the inner space at the center.

A hexagon is then drawn so that the eye is inscribed exactly within it.

This completes the Ancient Square and Compass Design based on a pentagram.

Math

All of the calculations are very straight forward.

The intersection of any two lines, written as line-a and line-b, defined as

$$\text{Line-a: } y = sa x + ba$$

$$\text{Line-b: } y = sb x + bb$$

Is found by setting them equal, and solving for x.

The radius of the inner circle is determined by using

$$\text{Line-c: } y = sc x$$

And sc is given by $-1/sd$, where sd is the slope of the inner edge of the compass on the right.

The vertices of the hexagon can easily be found from the inner circle radius –

Remembering that using the radius will produce an inner hexagon, while using twice the radius will produce the outer hexagon.

Your ritual assignment is to now reconstruct this figure on your own.

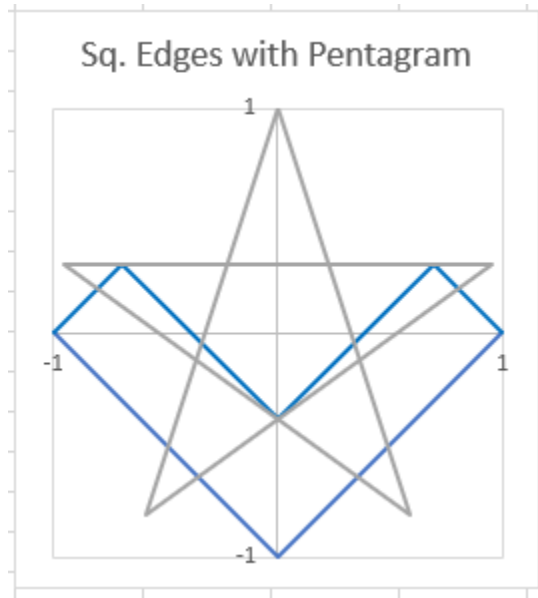
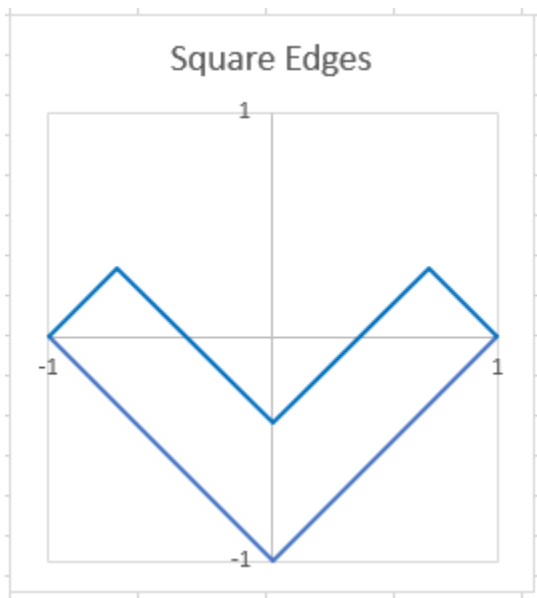
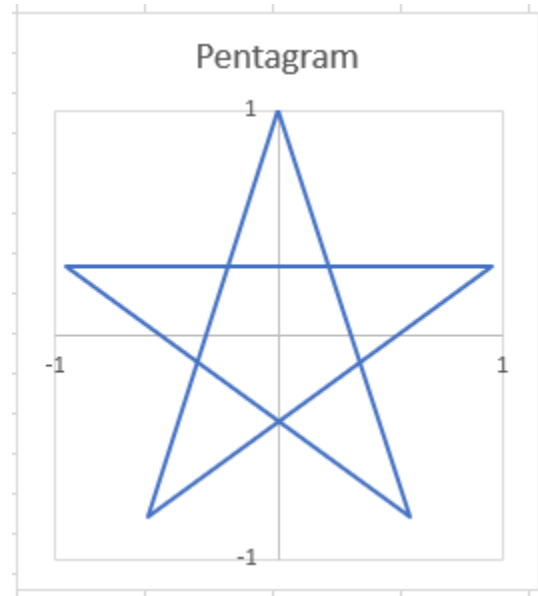
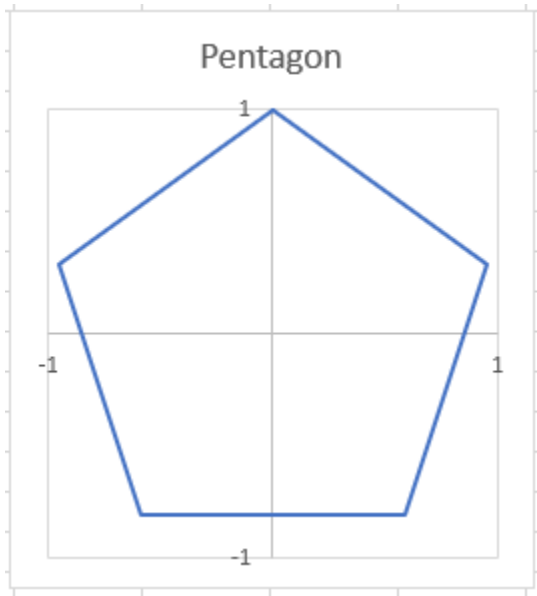
References

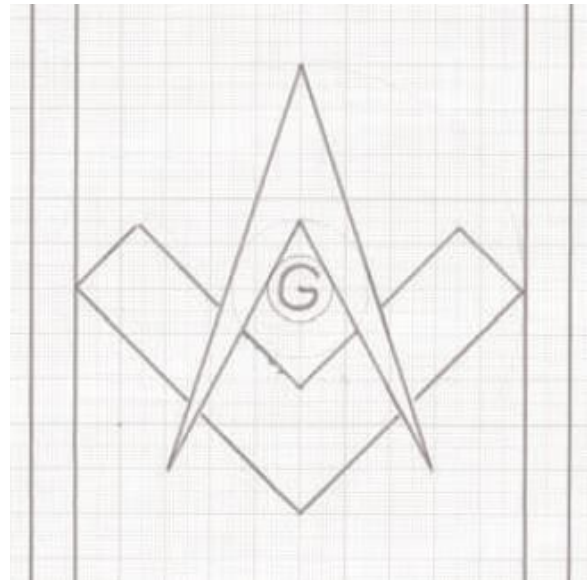
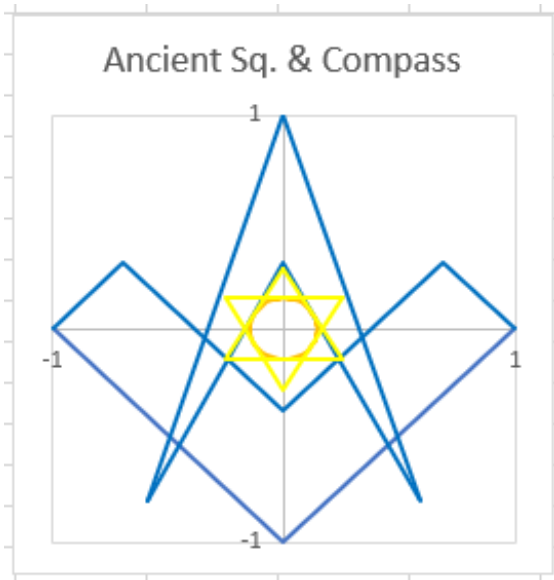
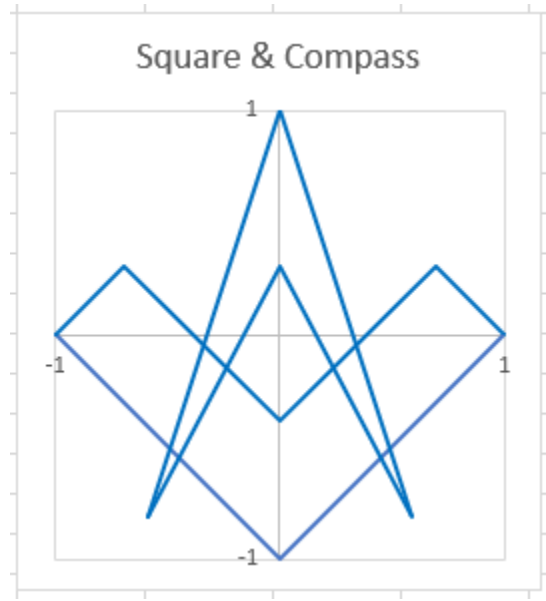
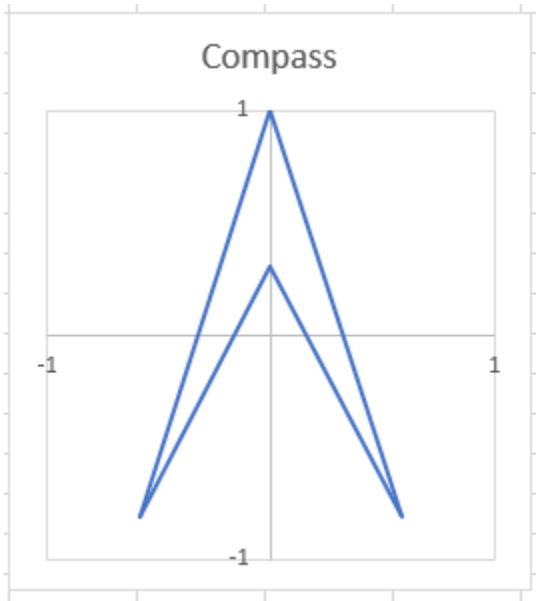
1 – “The Divine Proportion – A Study in Mathematical Beauty,” H. E. Huntley, Dover Publications (paperback book, 186 pp.), 1970.

2 – “Secrets of the Great Pyramid,” Peter Tompkins and Livio Catullo Stecchini, Harper & Row (hardcover book, 416 pp.), 1971.

3. “The Secrets of Solomon’s Temple - Discover the Hidden Truth That Lies at the Heart of Freemasonry,” Kevin L. Gest, April 1, 2007 (PDF 370 pp)

Figures





“The hidden design
set against the pavement
in the Brighton Masonic Temple”
[Ref. 3, page 162]