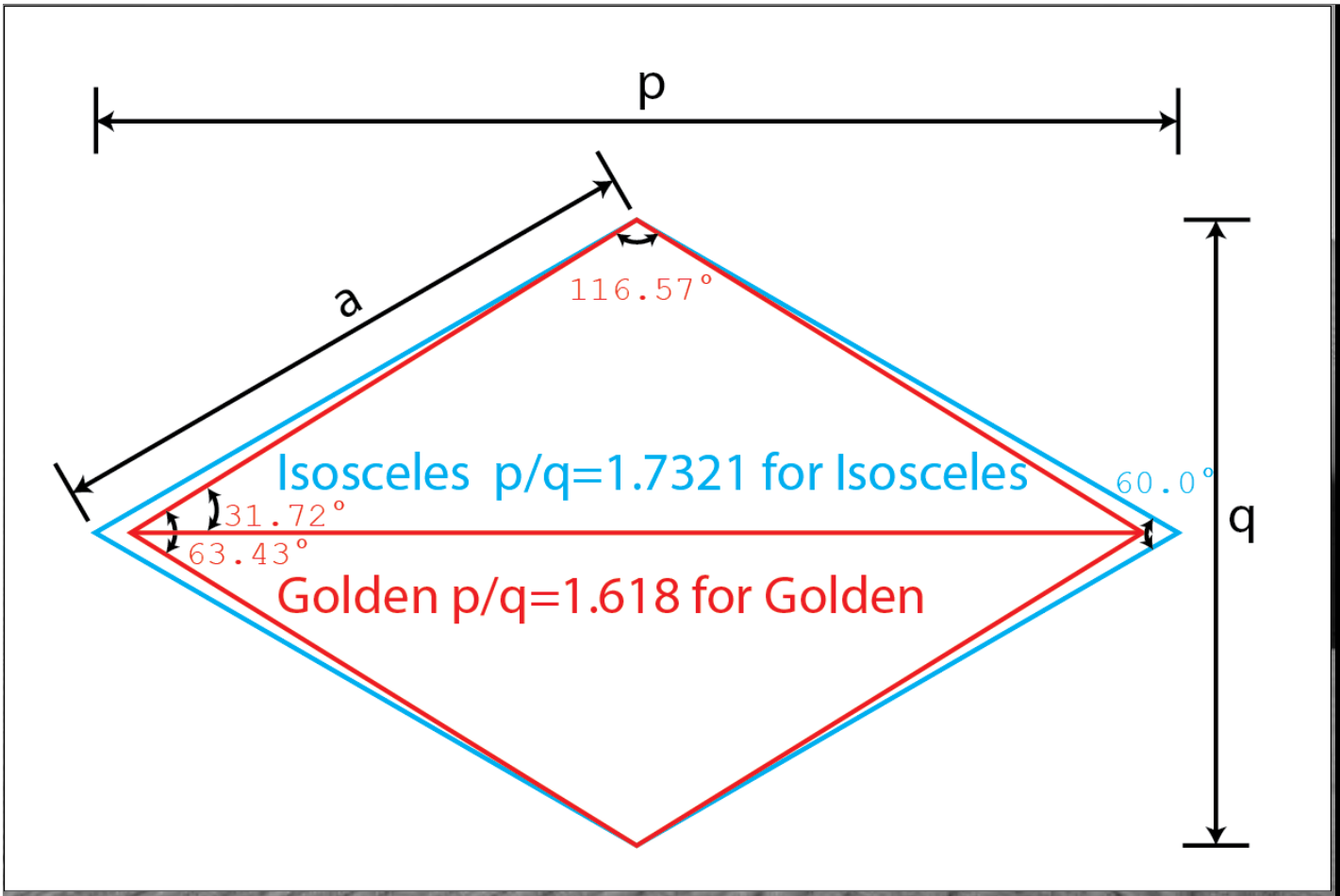


RHOMBUS USING ADOBE ILLUSTRATOR CS5

HOW TO DRAW A GOLDEN AND REGULAR RHOMBUS WITH ADOBE ILLUSTRATOR CS5

One method for drawing a Golden Rhombus (Rhomb or Diamond) using Adobe Illustrator [version CS 5 Illustrator v. 15.0.2] is described in this note.

RHOMBUS USING ADOBE ILLUSTRATOR CS5

HOW TO DRAW A GOLDEN AND REGULAR RHOMBUS WITH ADOBE ILLUSTRATOR CS5

INTRODUCTION

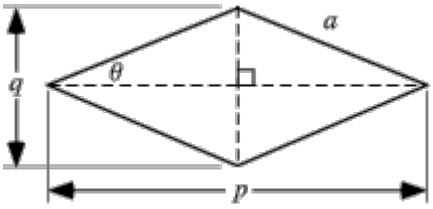
I needed to draw a Golden Rhombus (a rhombus with a *p/q* ratio of 1.618, we will see what *p* and *q* are below) and another rhombus with a *p/q* ratio of 1.7321 for a scientific presentation. I couldn't find a quick solution when I searched the Internet (*ca* Jan 2015) and so tried couple of methods. The note below describes one such attempt in making a rhombus using Adobe Illustrator CS5. *Please note the procedure might be different for other versions of Illustrator*.

A regular rhombus is defined with the following characteristics [*Plane Geometry for College Students*, William C. Stone, Allyn & Bacon, Inc., 1958]:

- All sides are equal
- The diagonals are perpendicular to each other
- The diagonals bisect its angles
- Has all the properties of a parallelogram

In addition, rhombus is very similar to a square and square rotated 45 degrees is occasionally called a diamond which is nothing but a rhombus.

The rhombus or rhomb has the following size definitions [Wolfram Math World; http://mathworld.wolfram.com/Rhombus.html]



Where *p* is the long diagonal, *q* is the short diagonal, *a* is the side and θ is the angle between one of the sides and the long diagonal, and 2θ would be between two sides with the long diagonal bisecting it.

GEOMETRIC SHAPE USING ADOBE ILLUSTRATOR

This note shows how to make a regular and Golden rhombus (aka rhomb or diamond) using Adobe Illustrator CS5.

Feb 2015

DRAWING A GOLDEN RHOMBUS

As I noted above a square can be considered a special case of a rhombus (just as circle can be considered a special case of an ellipse), so I thought of starting my experiment with a square.

I started Adobe Illustrator CS5 and opened a New Document (File >Ctrl+N) and accepted the default size (300 pt 250 pt) for the New Document. Then from the main palette I selected the Rectangle Tool (M) and clicked in the New Document. The Rectangle Tool window opened with *Options*. I input 100 pt for both *Width* and *Height* creating a square with default Stroke size of 1 pt.

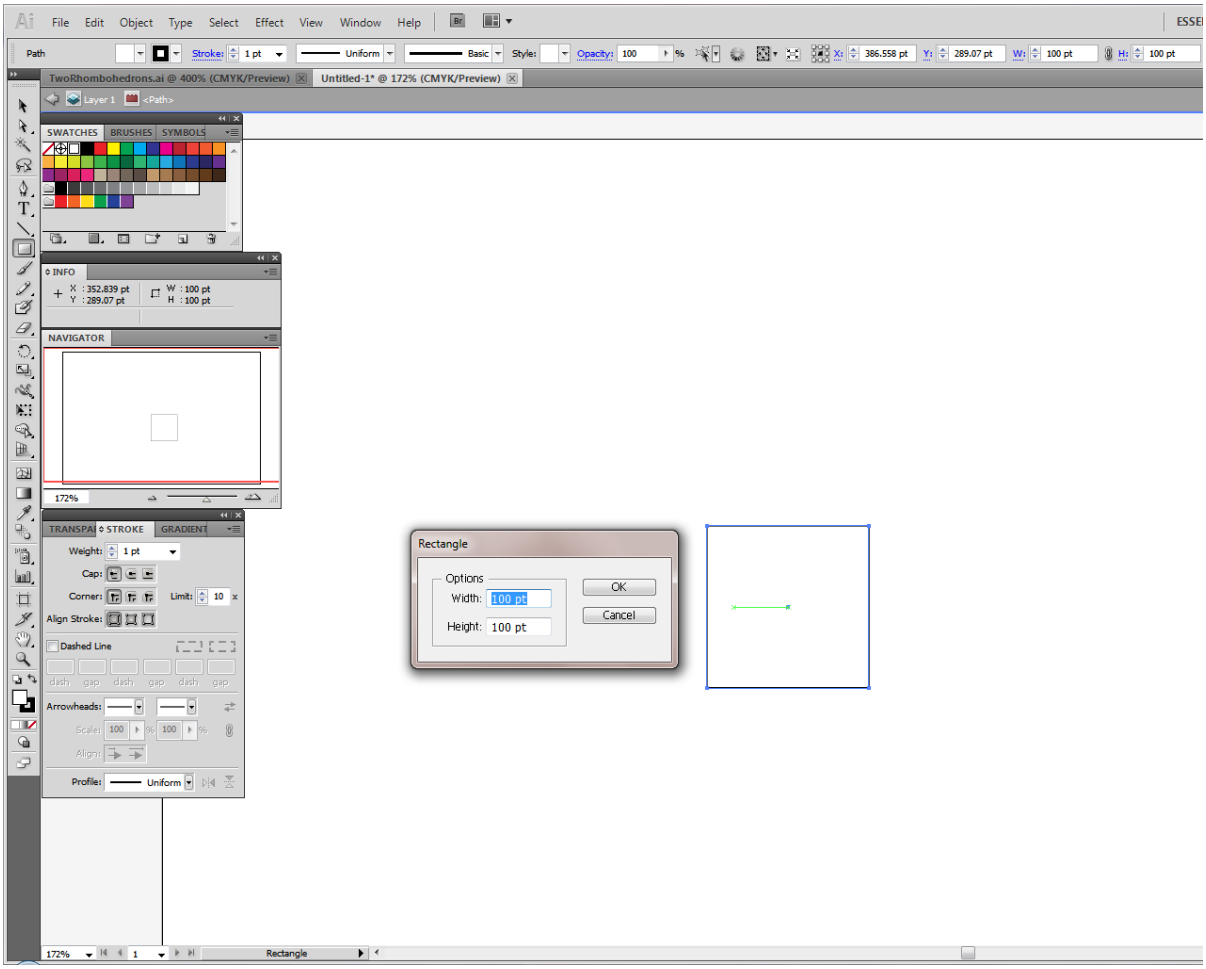


FIGURE 1 CREATE A SQUARE USING CS5

Then, from the Main Menu I selected the following: Object>Transform>Rotate …, and this opened a new Rotate window with *Angle* input. I input 45° and accepted it. The square now rotated 45° and looked more like a diamond (aka rhombus).

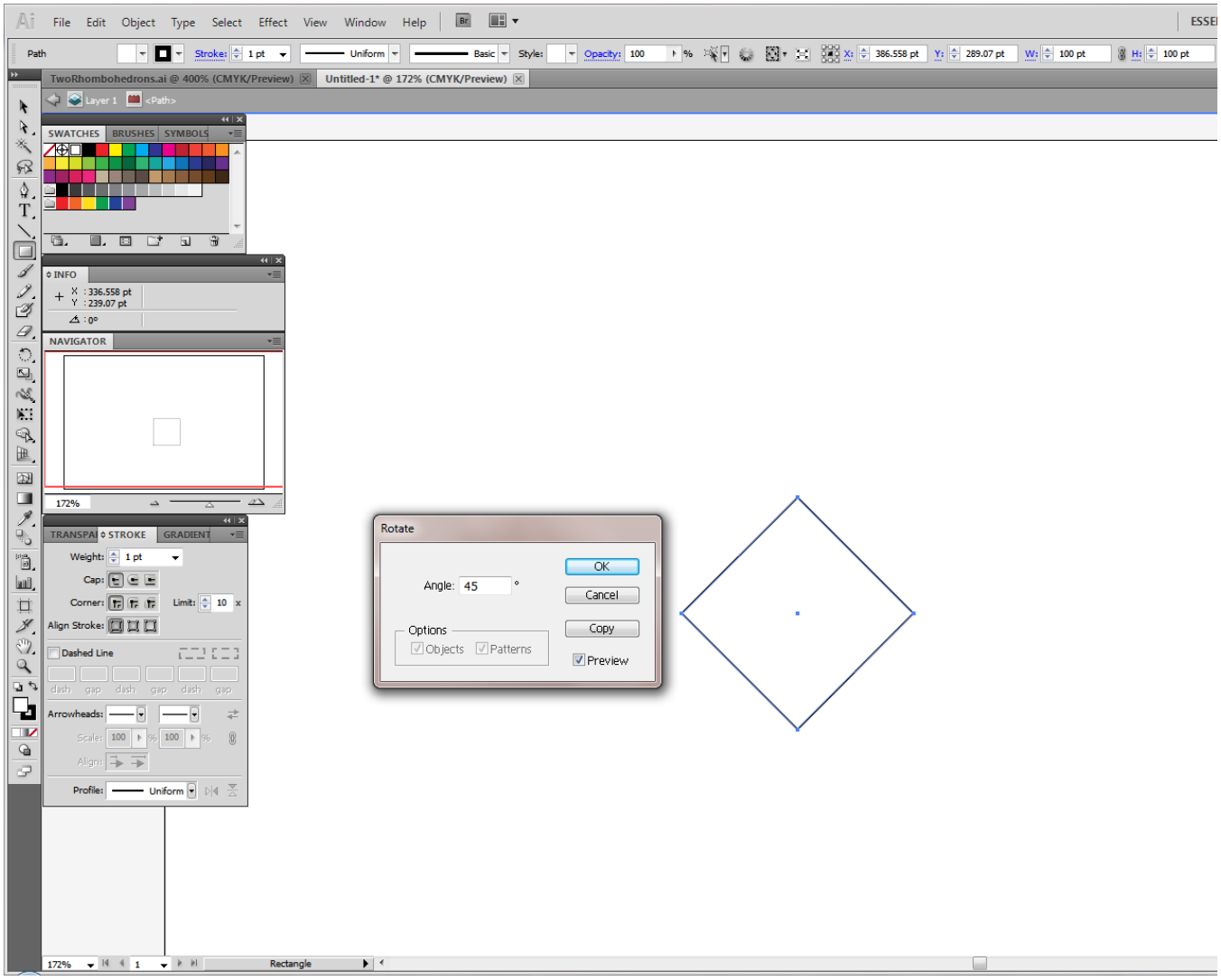


FIGURE 2 MAKE IT A DIAMOND

Then, again from the Main Menu I now selected the following: Object>Transform>Scale …, and this opened a new Scale window with *Uniform*, *Non-uniform*, *Options* and *Preview* inputs. Since I wanted to have different lengths for the diagonals, I selected Non-uniform scaling option. Since I didn't want my Strokes & Effects to be scaled, I didn't select Strokes & Effects, under Options (I had selected this, the Stroke thickness would scale up or down). I did select Preview so that I can see the actions of my selections even before I commit to it.

Here, for the Non-uniform I input for the Horizontal, 161.8 and for the Vertical, 100.0. This yielded me a rhombus shown below:

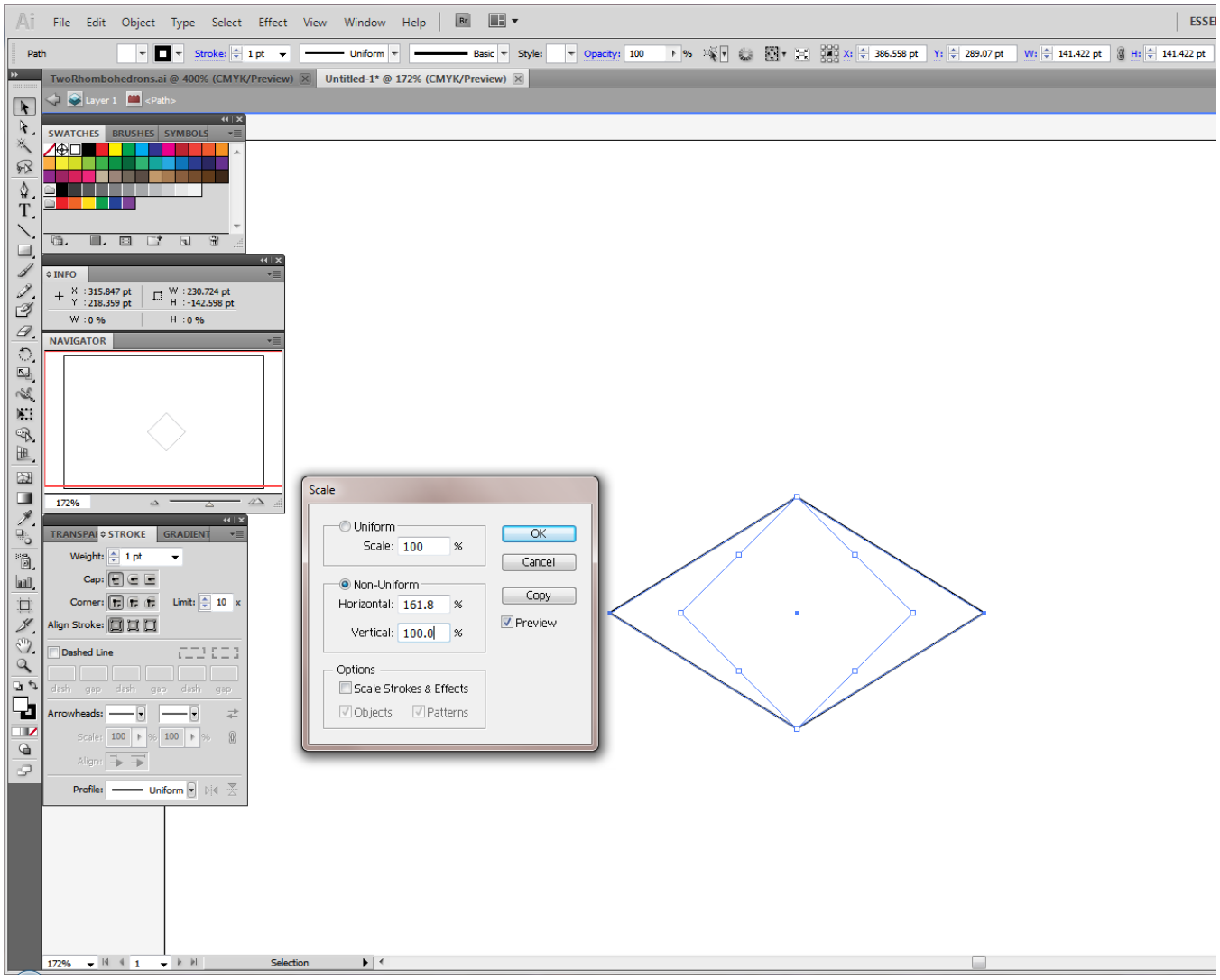


FIGURE 3 GOLDEND RHOMBUS

Here is another view with Stroke color selected to be "Red":

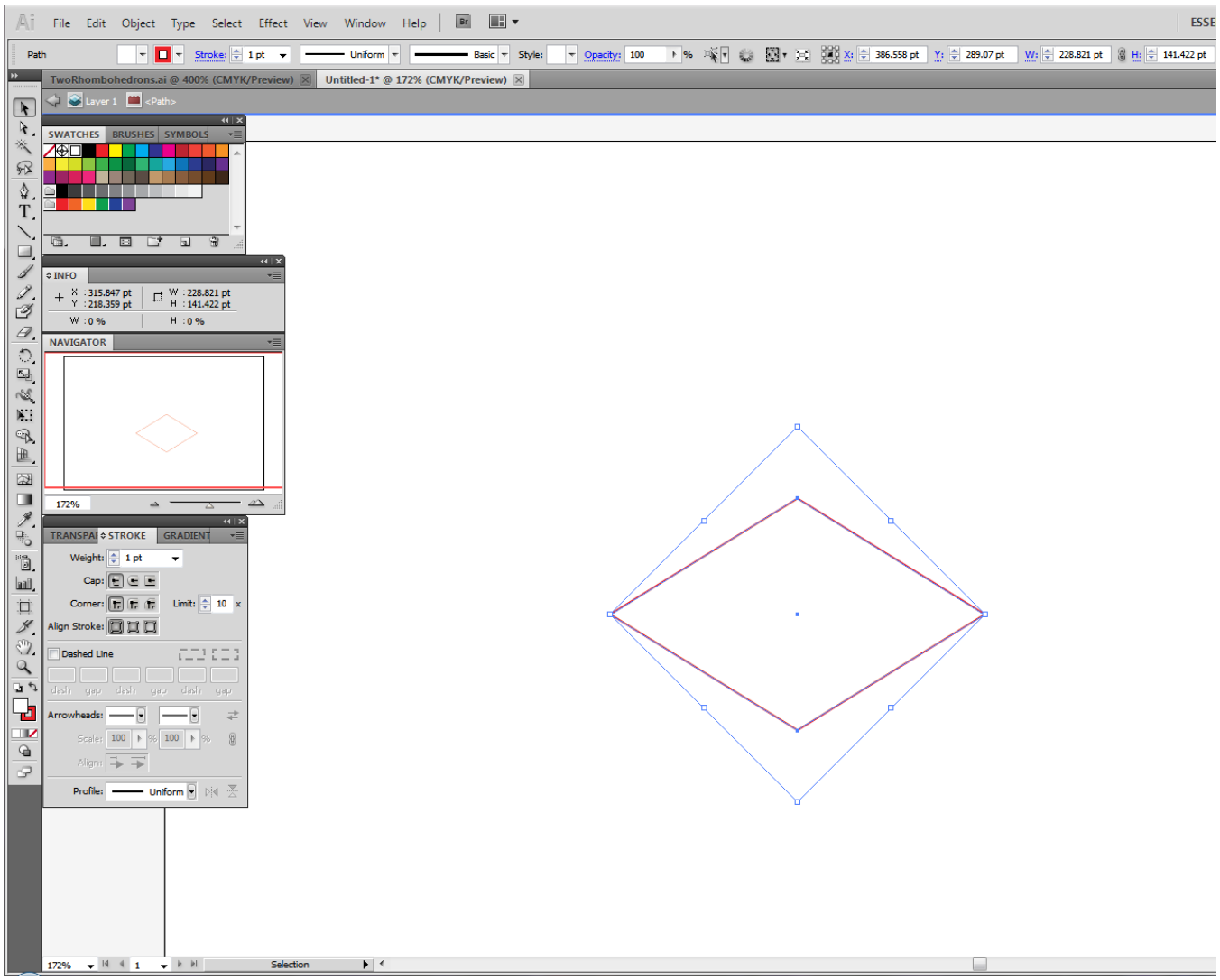


FIGURE 4 ANOTHER VIEW OF GOLDEN RHOMB

CONFIRMING A GOLDEN RHOMBUS

Now that I have drawn a Golden Rhombus with a p/q ratio of 1.16180, I needed confirm whether I have it correct. So, I selected a Line Segment from the Main Palette Tool (\) and clicked on the left side of the Golden Rhombus and drew a line across the long diagonal and length was 228.81 pt and then I drew a line on top of the left top side of the already created rhombus, I could see the "Info" for the line segment indicated the length was 134.5 pt and the angle was 32°. These are the values what I had expected.

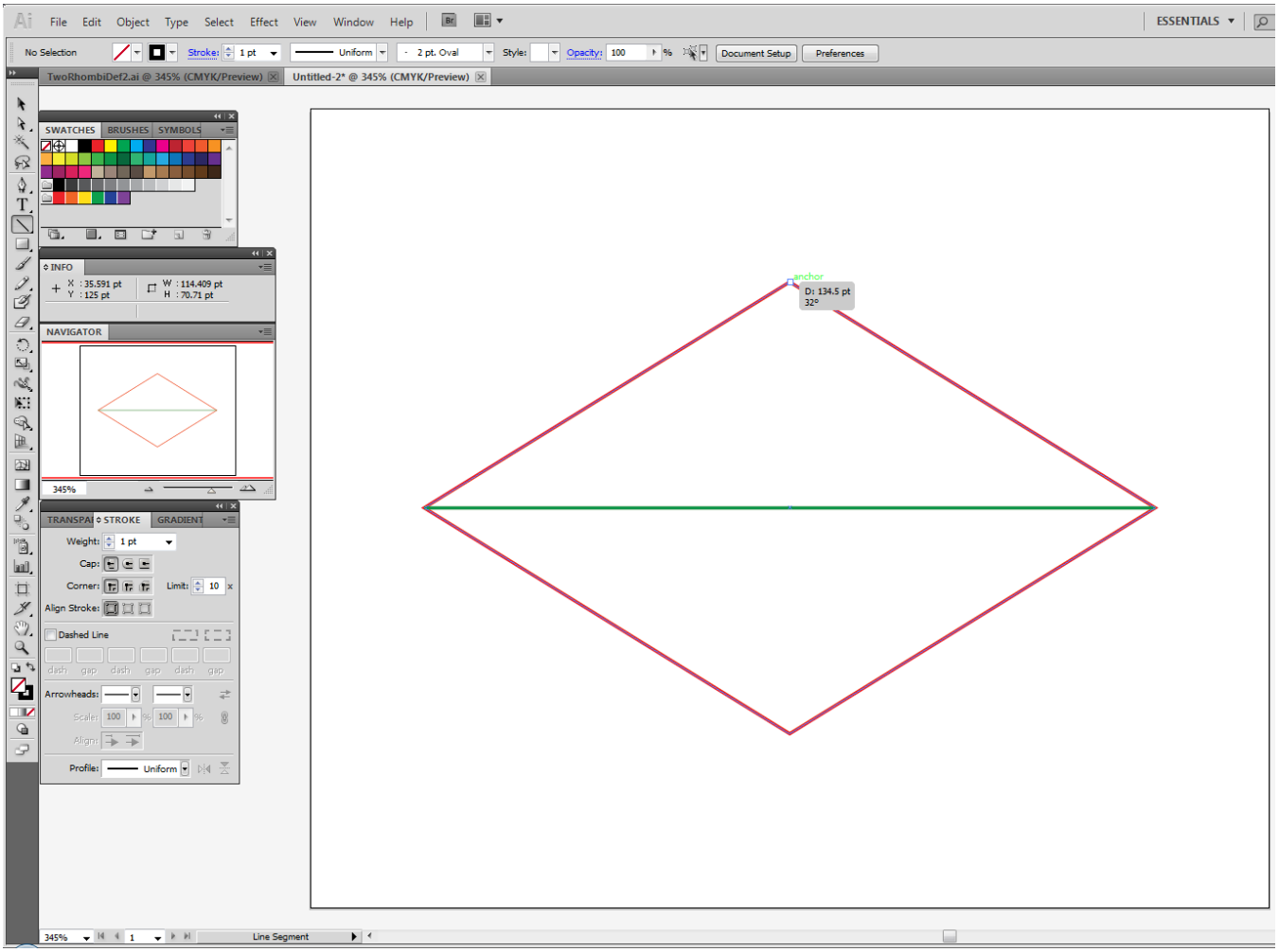


FIGURE 5 GOLDEND RHOMB SIDE CONFIRMATION

To confirm it further, I drew a line from the top apex of the rhombus to the long diagonal and its length was 70.71 pt with 270° angle. Once I again I had expected.

To confirm it further, I drew a 20 pt line segment and then drew another 23.65 pt line segment with 31.717° angle in between them (the Golden Angle) and grouped them together with their left most position intersecting with each other. Then I placed this newly grouped object on top of the Golden Rhombus. They perfectly matched indicating the correct angle indicating what I had obtained is indeed a Golden Rhombus.

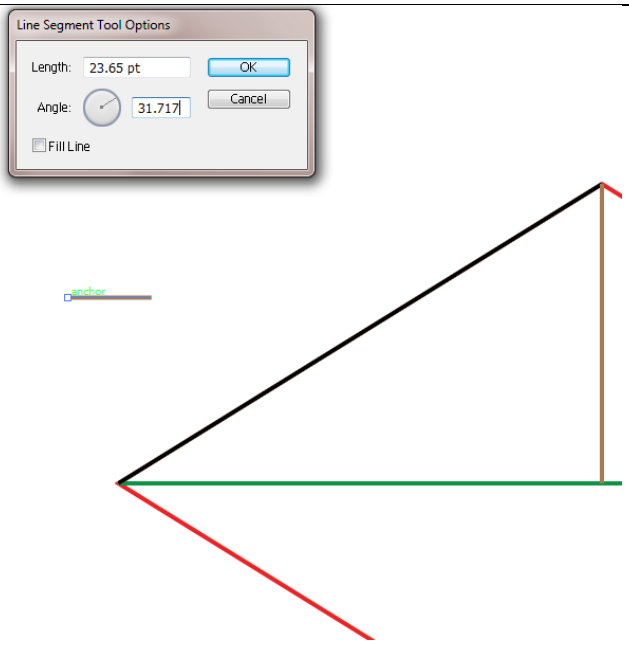


FIGURE 6 GOLDEN ANGLE 31.717

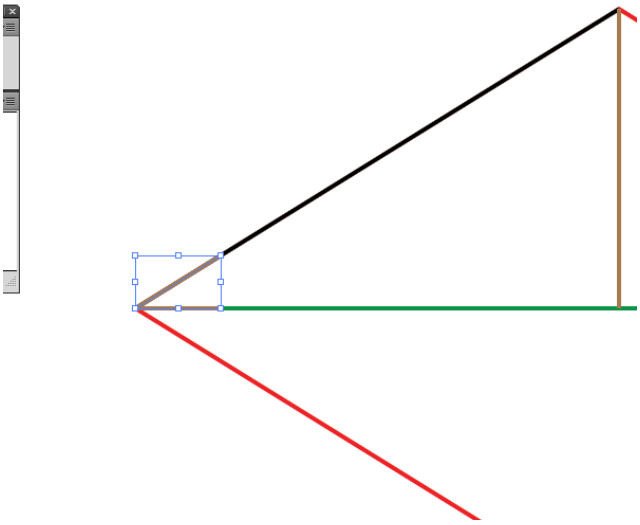


FIGURE 7 GOLDEN ANGLE CONFIRMATION

Next step is making a regular Rhombus. I followed all the instruction outlined above except for the amount of Non-uniform scaling. I wanted to create a rhomb with isosceles triangle. So I calculated the *p/q* ratio to be equal to 1.7321 (which is square root of 3; $\sqrt{3}$=1.73205). So, I created a square with 100 pt sides and rotated it 45°. Then, did the non-uniform scaling with horizontal value of 173.2 pt and vertical value 100.0 pt. This resulted in a rhombus with isosceles triangles on the side and is shown below.

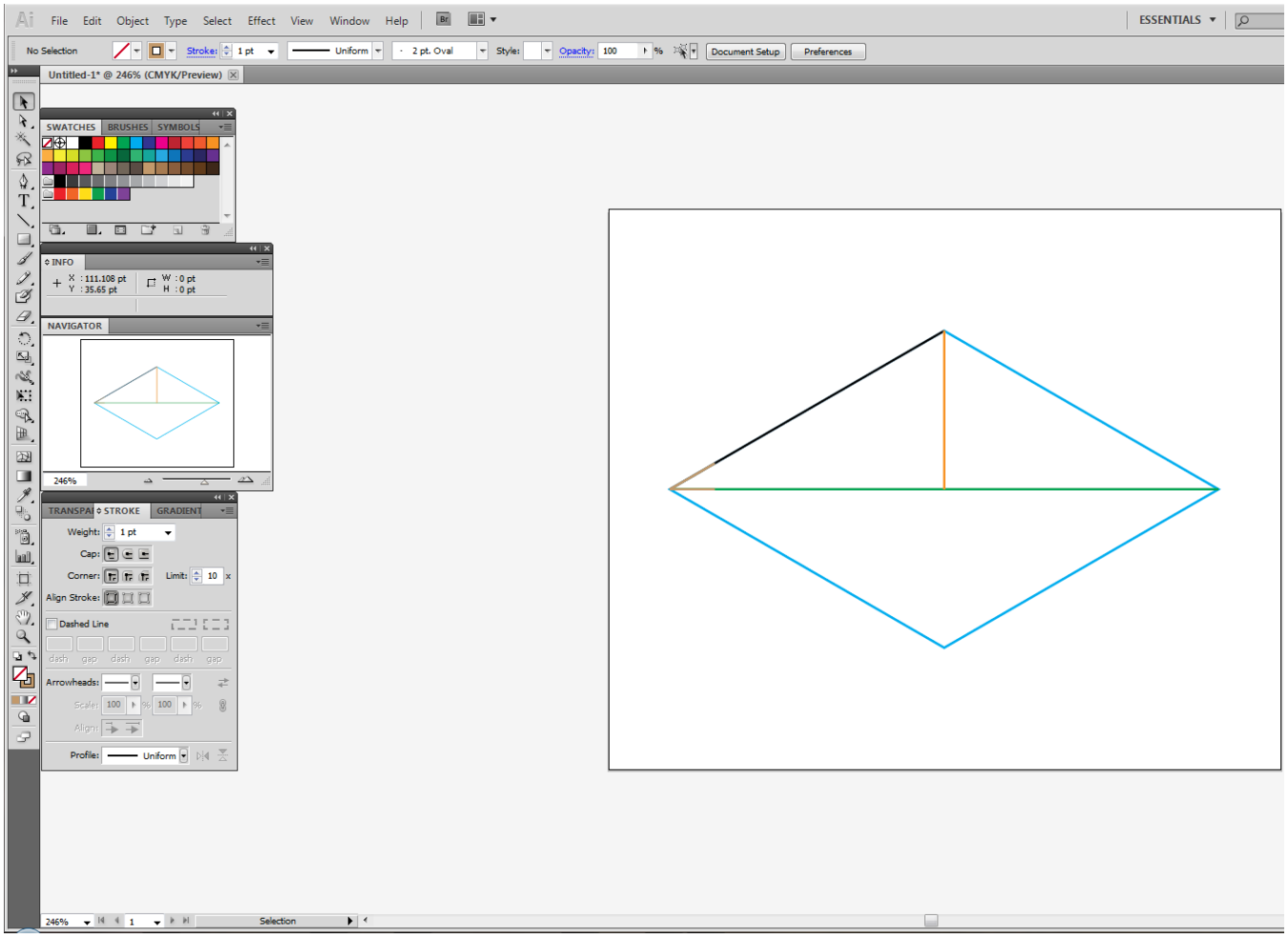
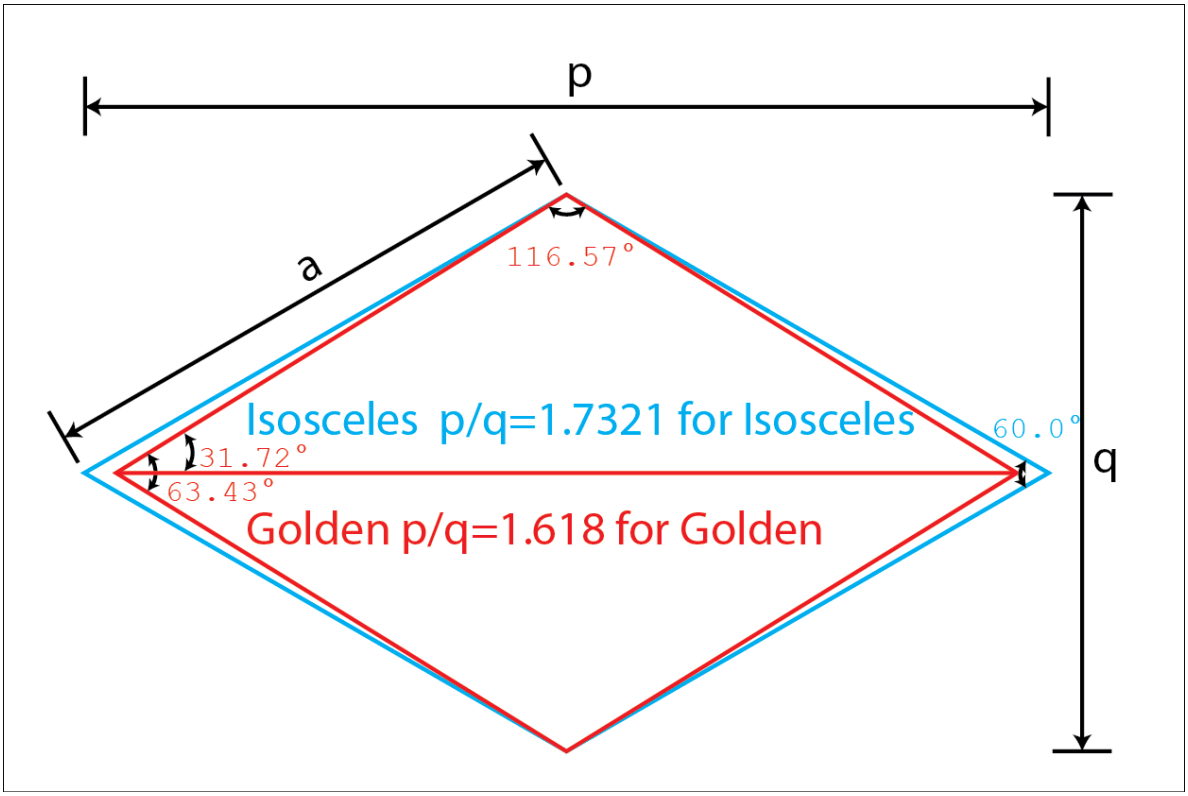


FIGURE 8 RHOMBUS WITH ISOSCELES TRIANGLE

Here are both superimposed one on top of the other with some important angles shown.



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