Co-funded by the Erasmus+ Programme of the European Union

How To Draw a Rose Window

Name of the object	Rose Window
Recommended ages	Activity for learners 10-14 years old
Thematic areas combined (STEAM)	Engineering, Art, Mathematics
Materials needed	• A3 Paper • Compass • Rulers • Fine line (different measures, 1, 08, 04, 02)
Instructions step by step	**Step 1** – Beginning **Step 2** – Inside the Rose **Step 3** – Connections **Step 4** – The centre details **Step 5** – Colouring

Step by step: how to draw a rose window

Step 1 - Beginning

Time needed 10-15 minutes

Rose windows, which reached their apogee in Gothic cathedrals in France, can be found in various sizes in these structures, but the main ones were meant to evoke a vision of heaven, and bathe the worshipper in divine light. In the otherwise drab surroundings of the medieval city, there is no doubt that their beauty and luminous colours created an experience for the viewer that is unimaginable in our current, visually saturated culture.

The construction process described below results in a slightly simplified version of a gothic rose window, leaving out the smaller details. It requires working on a large sheet of paper (no less than A3, but larger is recommended), as the scale becomes quite intricate.

Start with a circle divided into 12 parts (Image 1).

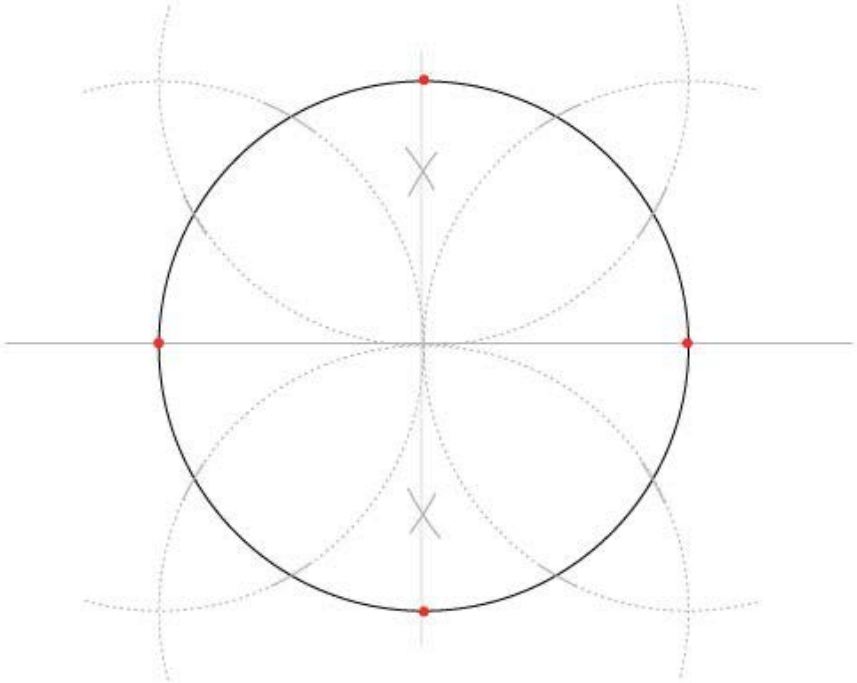

Image 1

This method is chosen here because it has the advantage of not requiring construction lines outside the circle, which means that we can draw the circle as large as possible on our sheet of paper. More on why this is desirable later.

Below, note how I also reduced the crossing arcs used to find the bisector, so that they fell inside the circle.

Join every fifth point on the circle to form a dodecagram (Image 2).

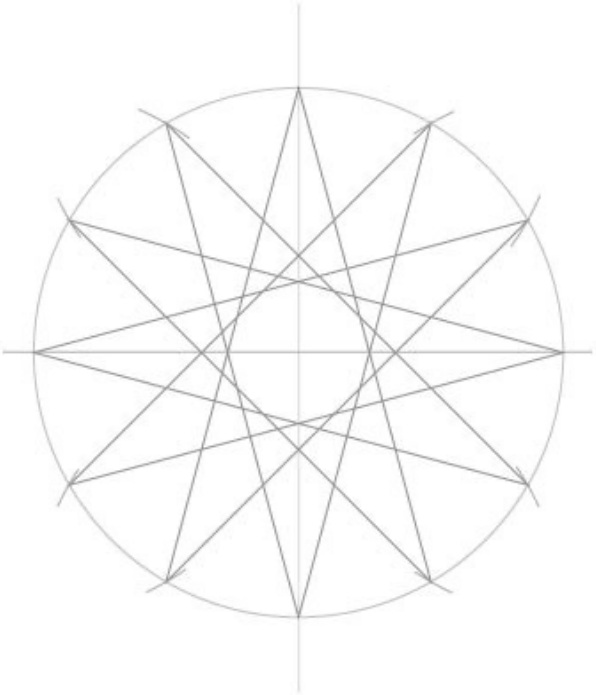

Image 2

Connect opposite points of the dodecagram so that each of the outer kites is bisected (Image 3).

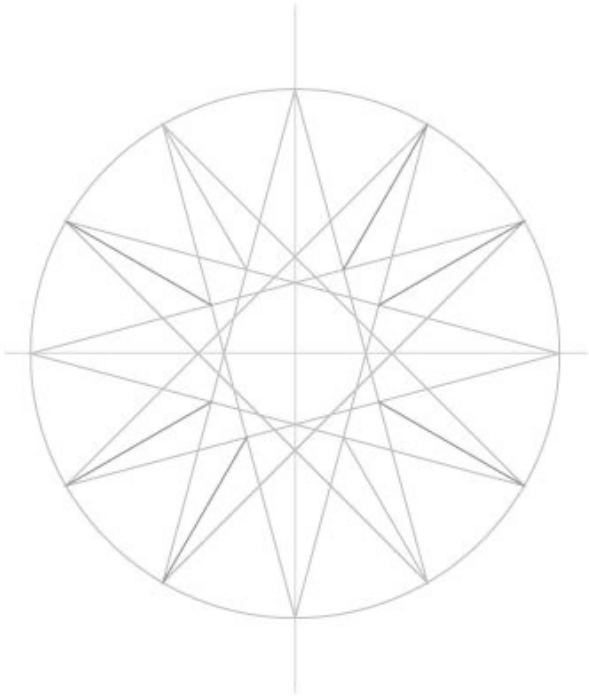

Image 3

Step 2 – Inside the Rose

We now need to nest a circle inside each of these kites. First, I'll zoom in on one of them, and name some points for clarity (Image 4).

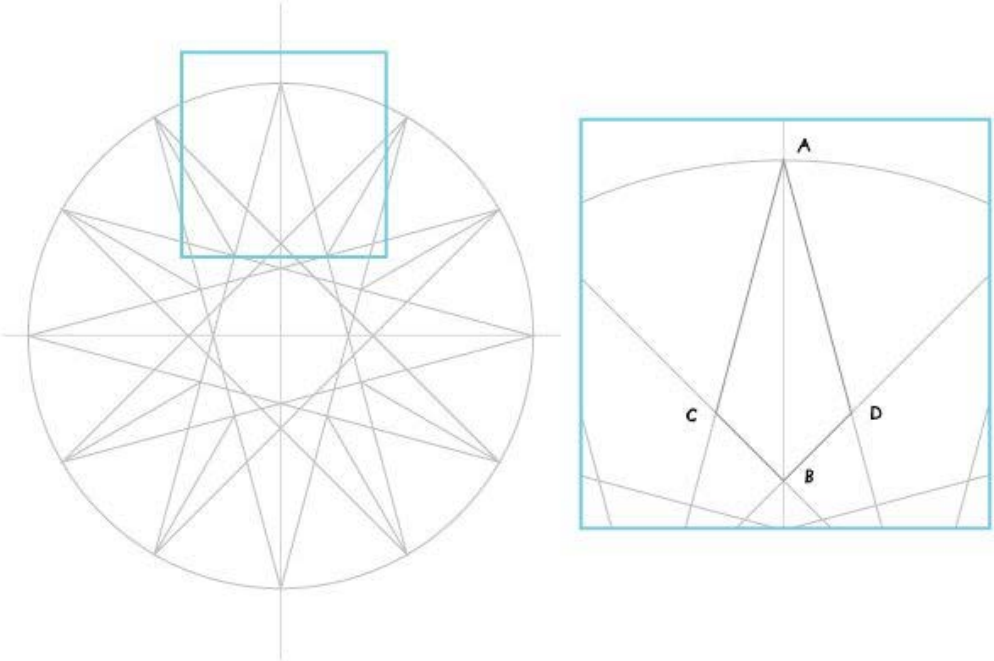

Image 4

Start by bisecting the angle ACB. The bisector cuts the segment AB at O, which will be the center of the circle (Image 5).

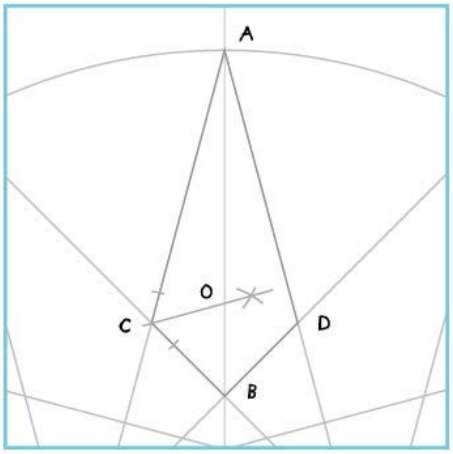

Image 5

With the point of the compass on A, opening AO, draw a partial arc outside the kite. Repeat with the point on D, opening DO. The two arcs intersect at E (Image 6).

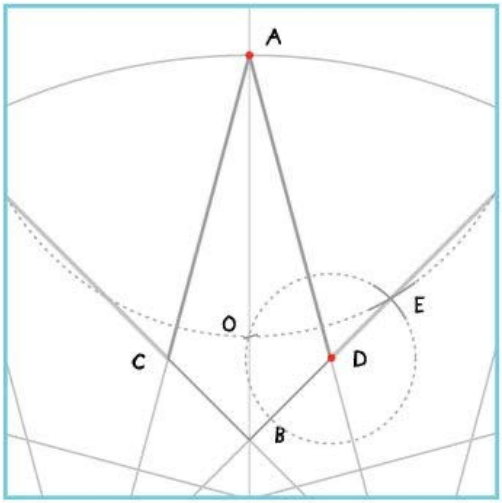

Image 6

Connect EO to find point F on the side of the kite (Image 7).

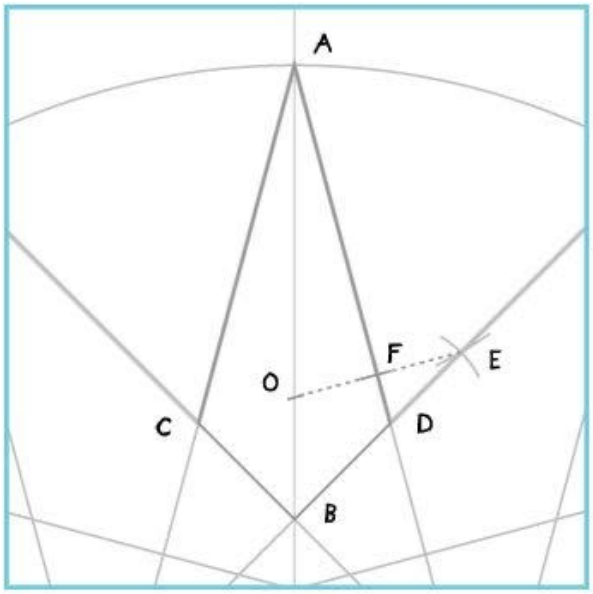

Image 7

Draw the circle centered on O, opening OF (Image 8).

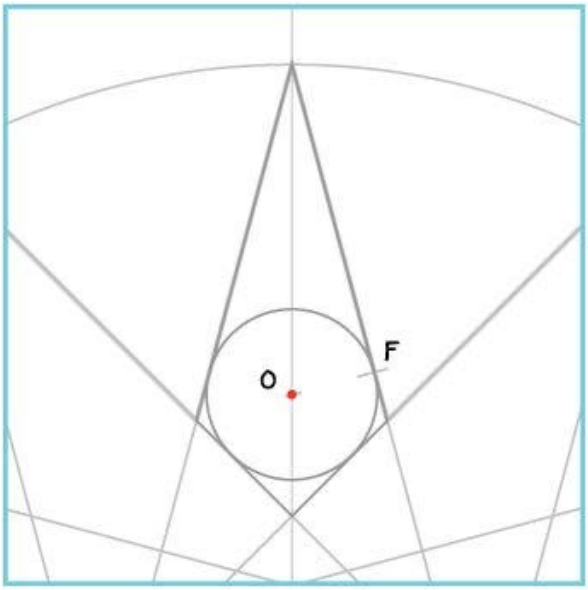

Image 8

We now have the first of our 12 circles (Image 9).

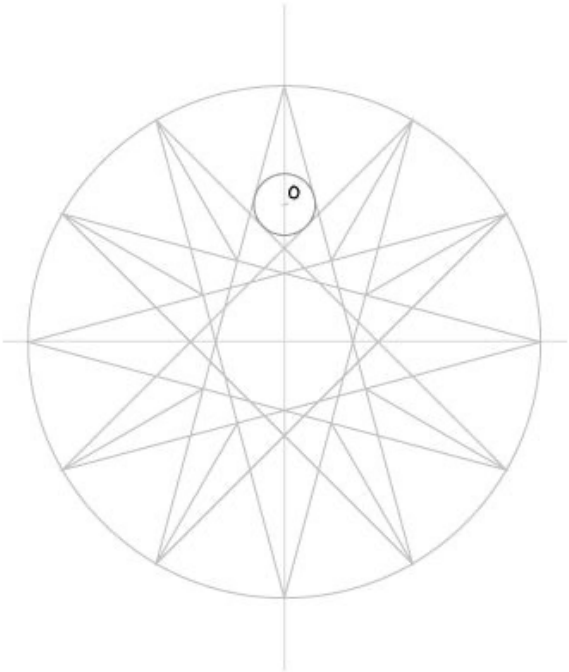

Image 9

There's no need to repeat these steps for the 11 remaining circles! We have the two measurements we need for this set of outer circles (remember this denomination because we will refer back to them): the position of the center O on the kite's bisector, and the diameter.

Transferring the position of O to the rest of the set is done by placing the compass point on the centre of the original circle (we'll refer to it as the original centre), and drawing the circle that passes through O. This cuts the bisectors of all the kites in their respective O's (Image 10).

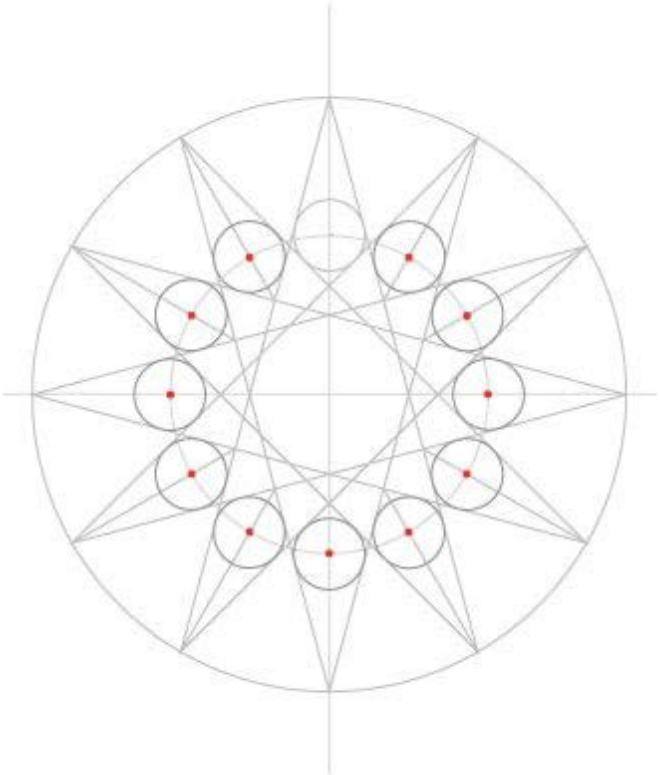

Image 10

Step 3 - Connections

Time needed: 1h

Connect the outer point of the outer circles (it is on the bisector) to draw another dodecagram. It is exactly the same as the first one, only smaller (image 11).

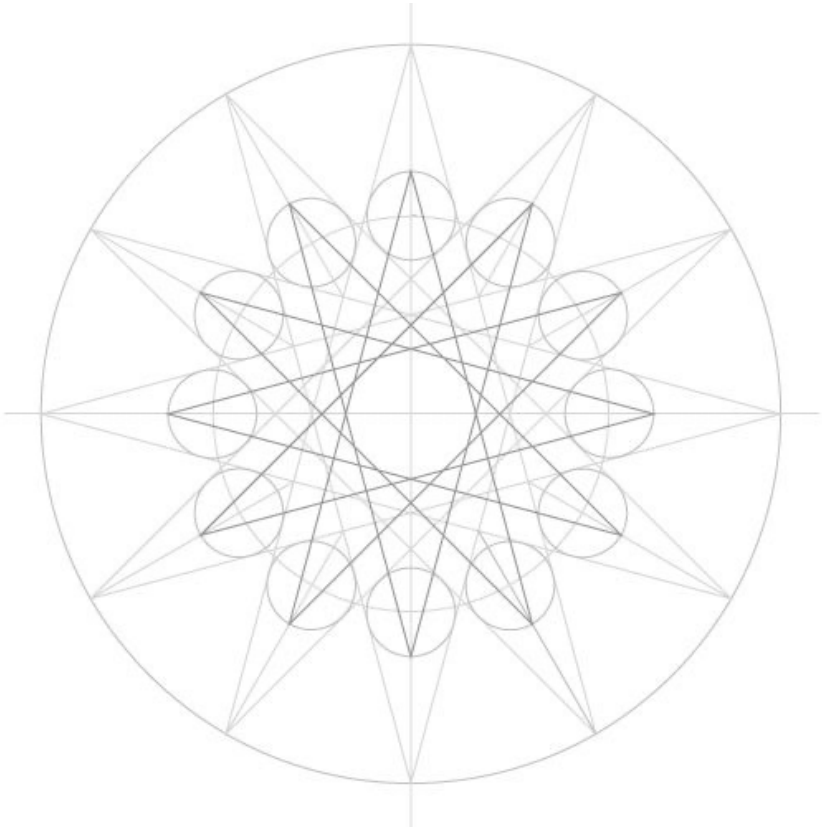

Image 11

Now, here is why we have worked with as large a circle as possible: only the central part really constitutes the rosette. To define the actual rosette, draw the triangle shown in image 12…

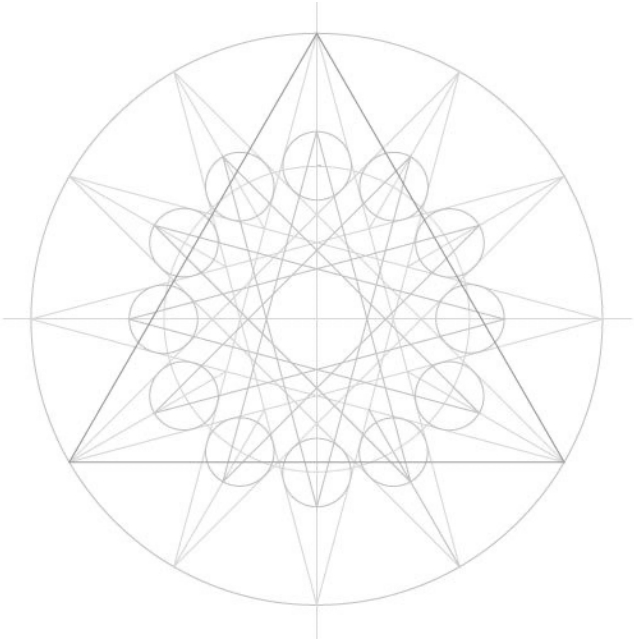

Image 12

... and then the circle inscribed in it, in a thicker outline, as it is a final line. Everything outside this circle is extraneous to the final design (image 13).

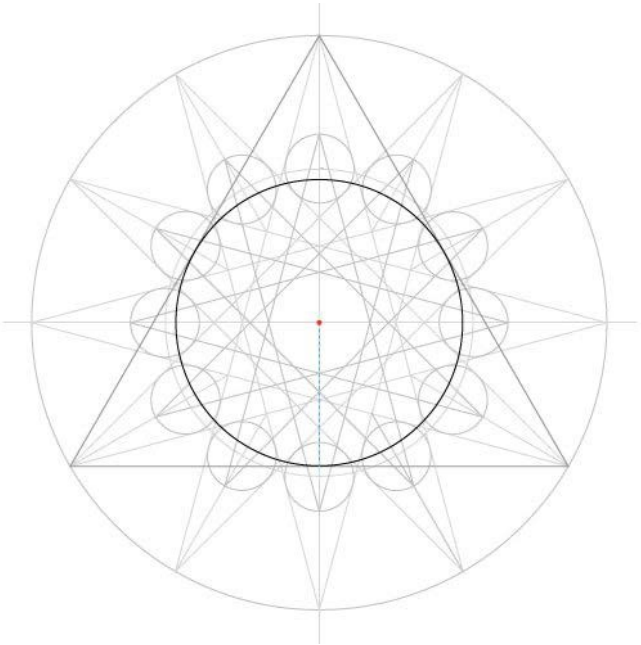

Image 13

From now on, for clarity, the diagrams will show the close-up version below, up to the outer circles (image 14).

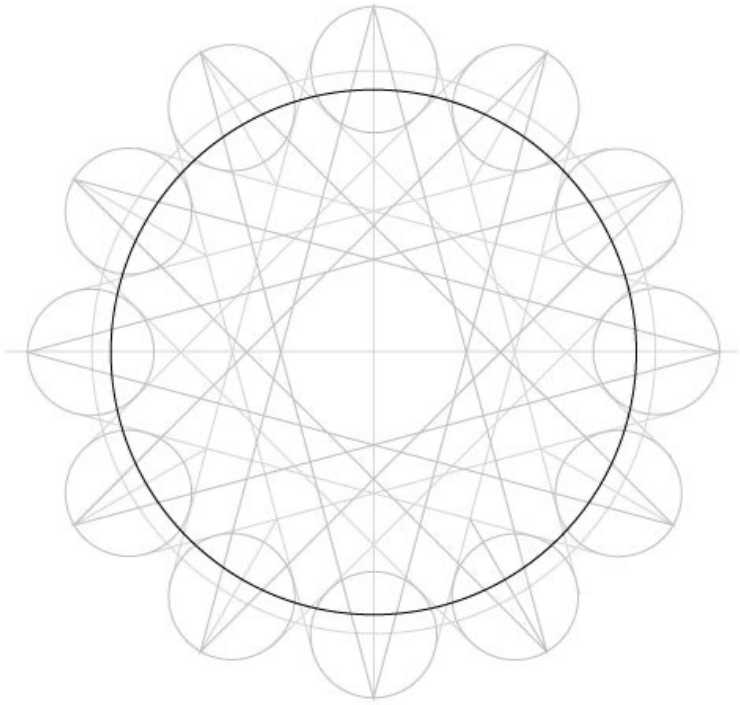

Image 14

The combined lines of the two dodecagrams create squares. It is good to highlight the lines now, as it helps to make the set of lines less confusing. They may not look like perfect squares, but it's an optical illusion because of all the intersecting lines. In fact, each of them is made up of two pairs of perfect parallels, and they can't be anything but perfect (image 15).

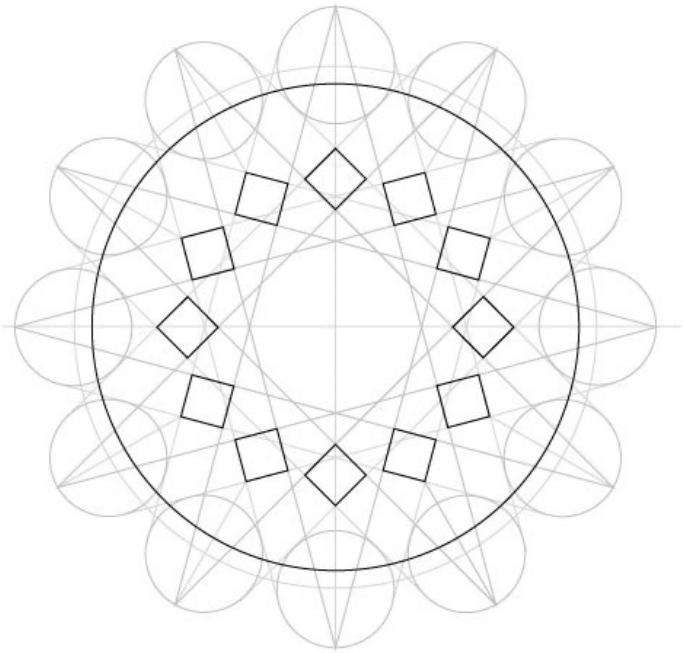

Image 15

Also ink the parts of the outer circles that are inside the defining circle (image 16).

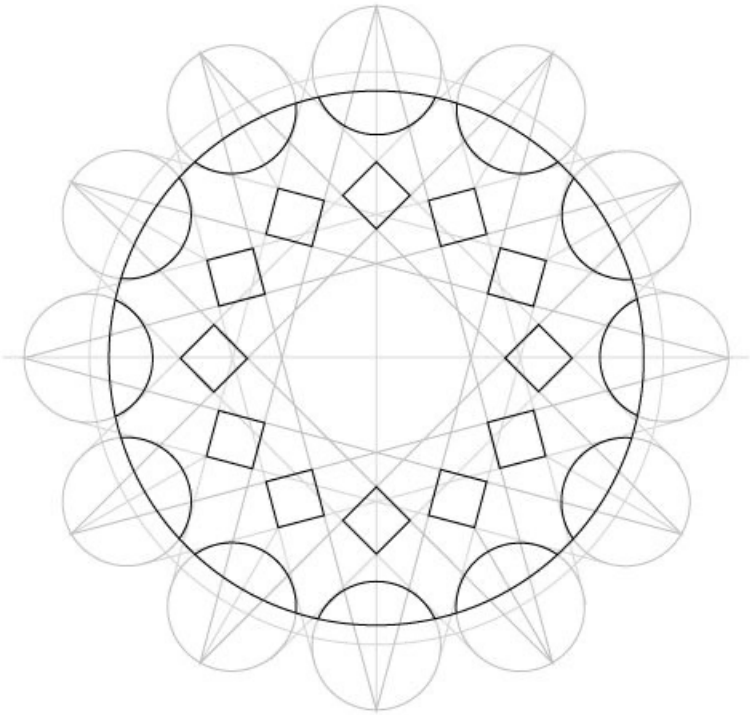

Image 16

For what comes next, which is nesting a smaller circle into these partial circles, we'll work with a close-up again, see images 17 and 18.

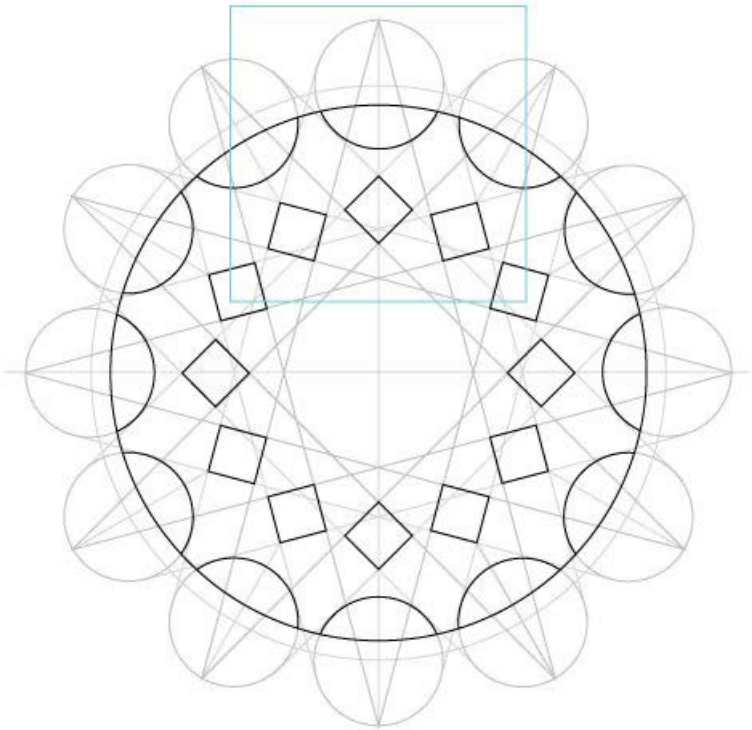

Image 17

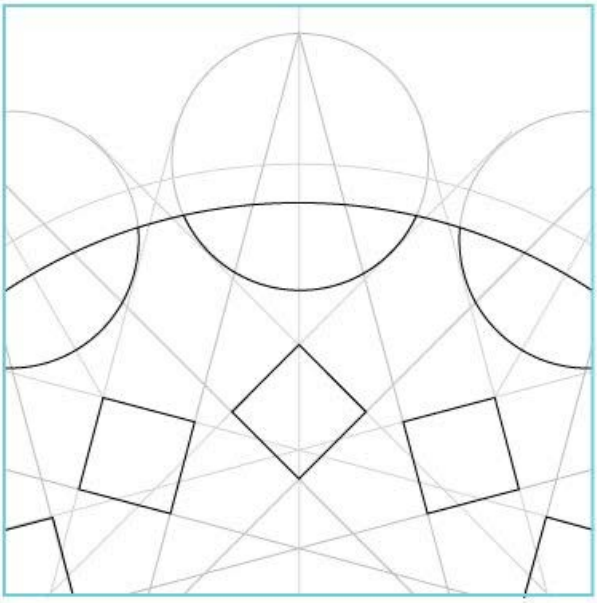

Image 18

Bisect the median line in this shape (image 19) to draw the circle (image 20).

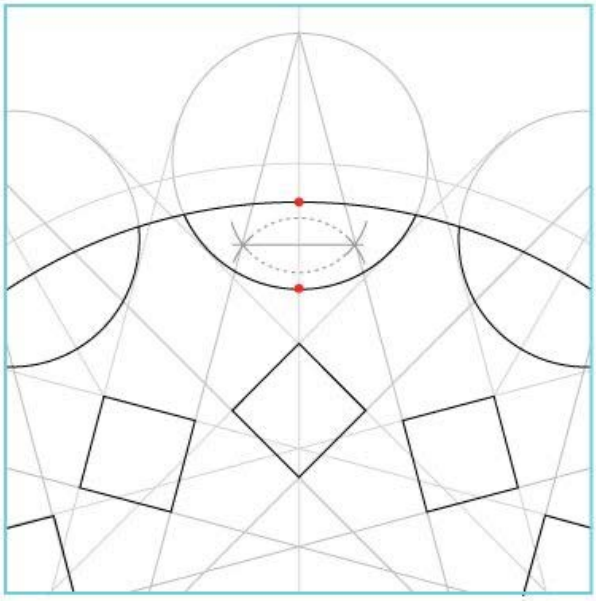

Image 19

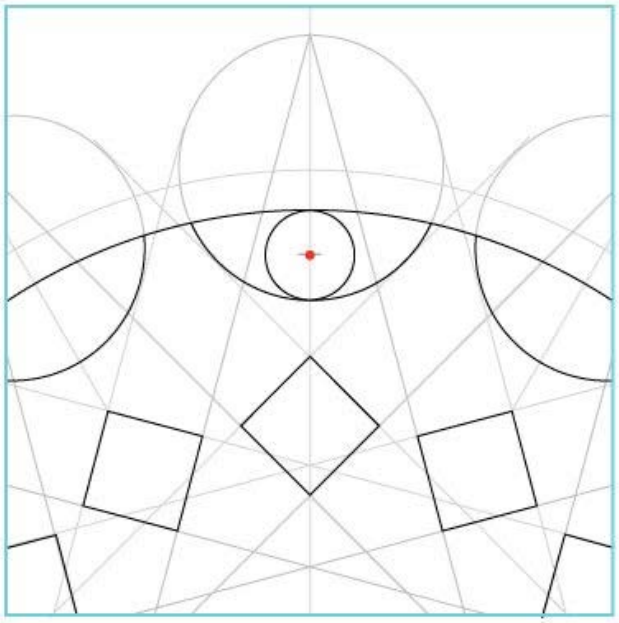

Image 20

As we have done before, use an overall circle to mark all the centres, and draw the full set of small circles (image 21).

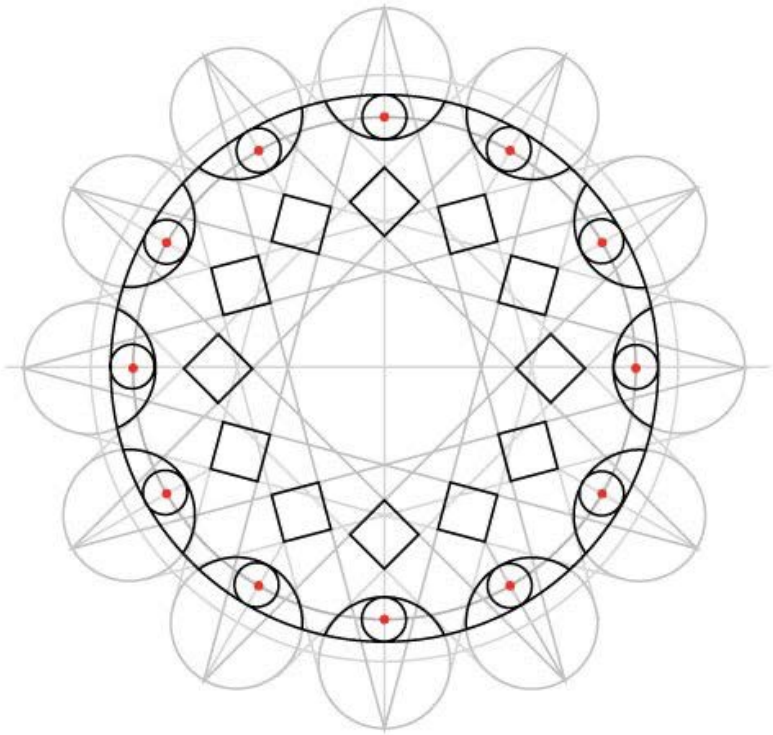

Image 21

Let us now zoom in on the central area of the window (image 22 and image 23) and draw the circle encompassing this pair of circles. All this was to create a circle with a diameter of 1.5 times the diameter of the small circle (image 24).

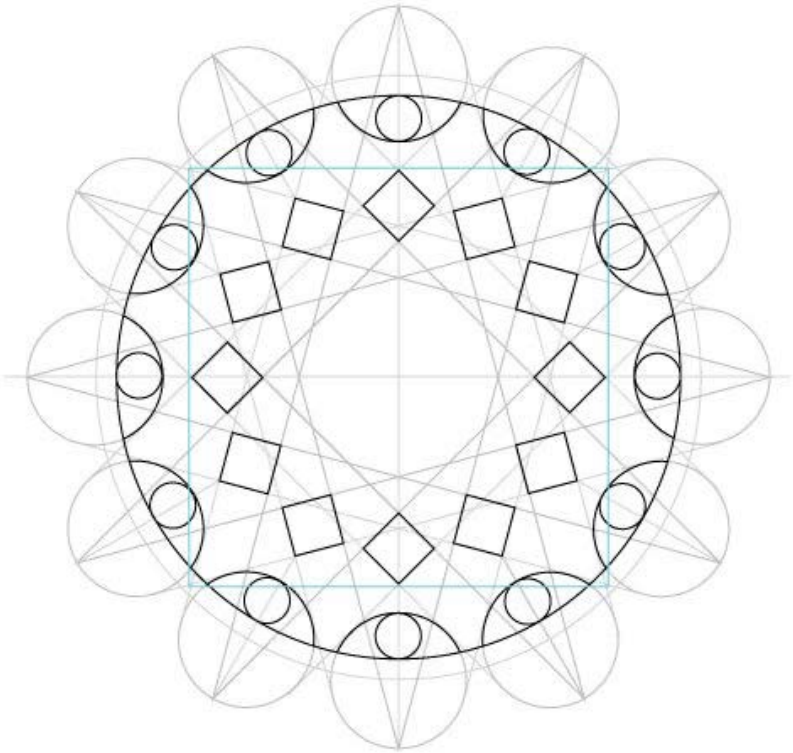

Image 22

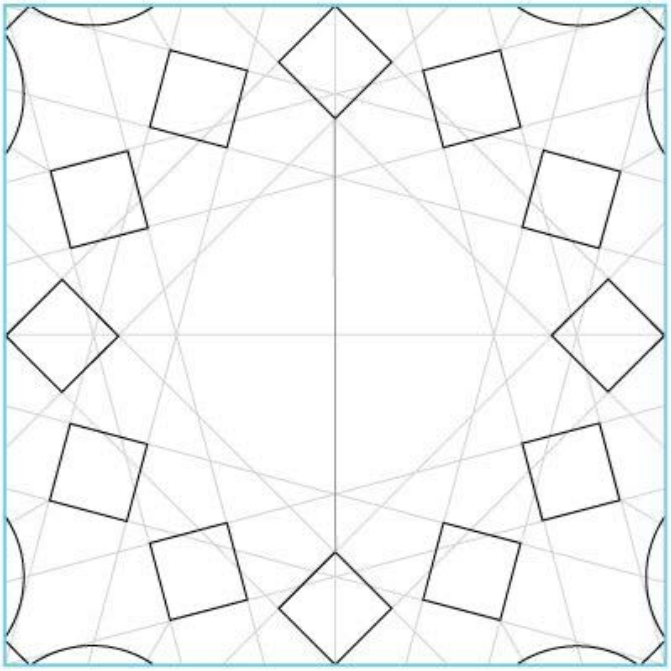

Image 23

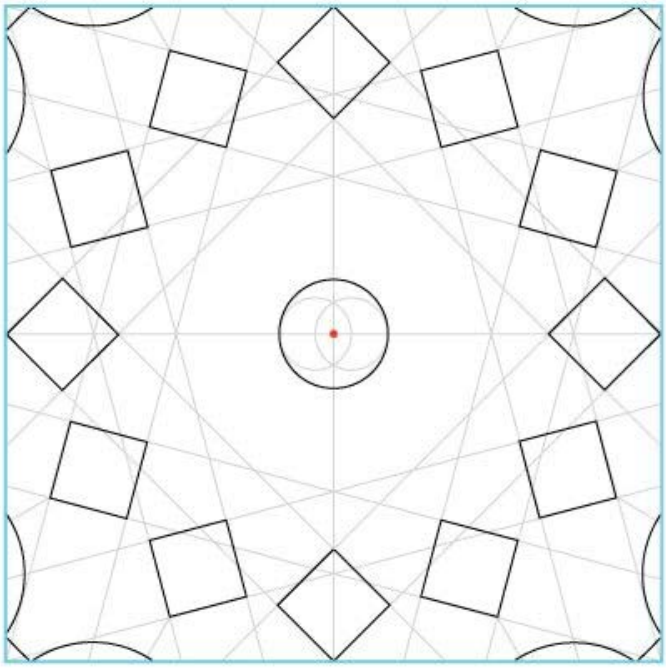

Image 24

Step 4 – The centre details

Time needed 1h

Draw the following lines, which join a series of points, so they pass between the squares (image 25).

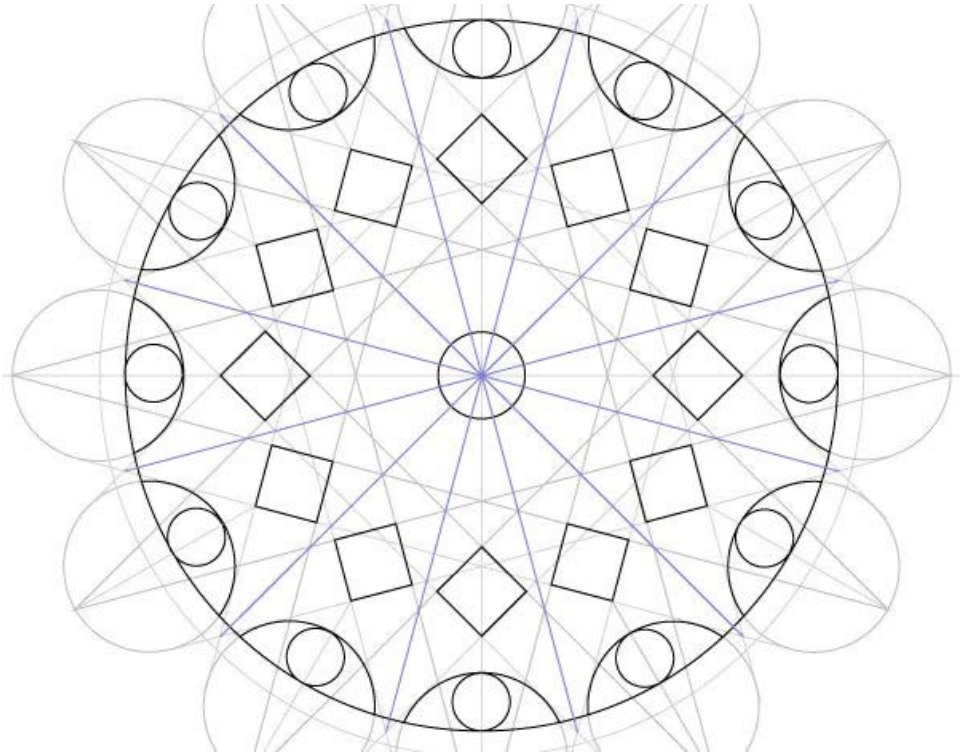

Image 25

From the central point, draw the widest circle, 1 cm more in diameter (image 26).

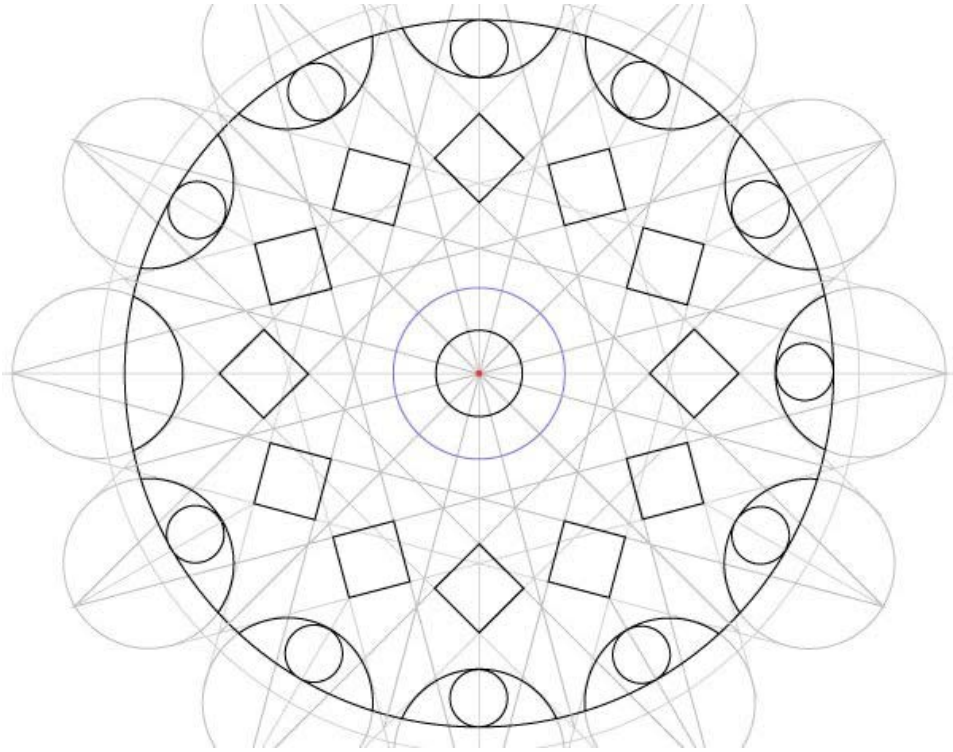

Image 26

Set the compass to the same measurement as the small circles and draw 12 circles centred on the intersections shown in image 27. Ink the circles (image 28).

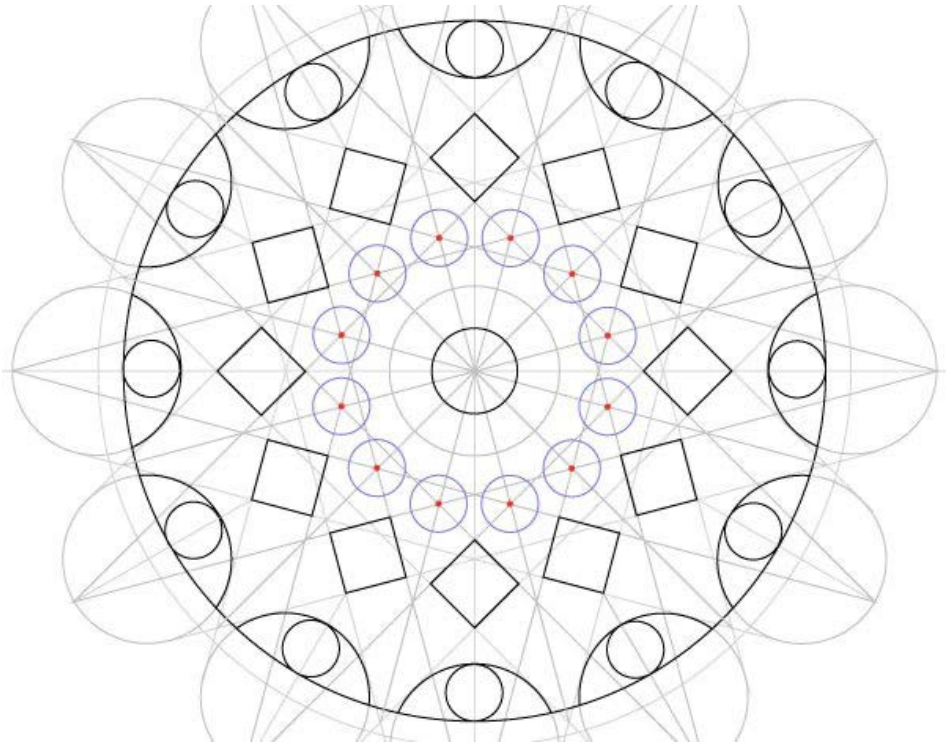

Image 27

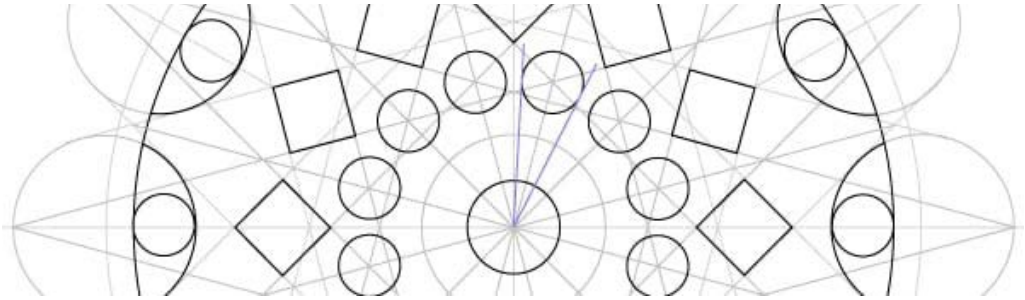

Image 28

From the original centre, pull two lines touching a circle on either side. Using the circle drawn in image 26, place the compass point and draw a circle tangent to the two lines. (If things are getting very small by now, a circular template may be useful, but with a good compass it's possible to draw very tiny circles) – (image 29).

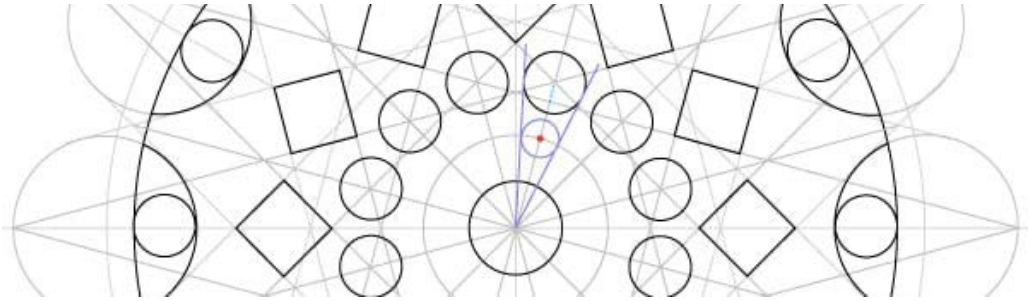

Image 29

Ink the shape formed by the two lines and part of the circle (image 30).

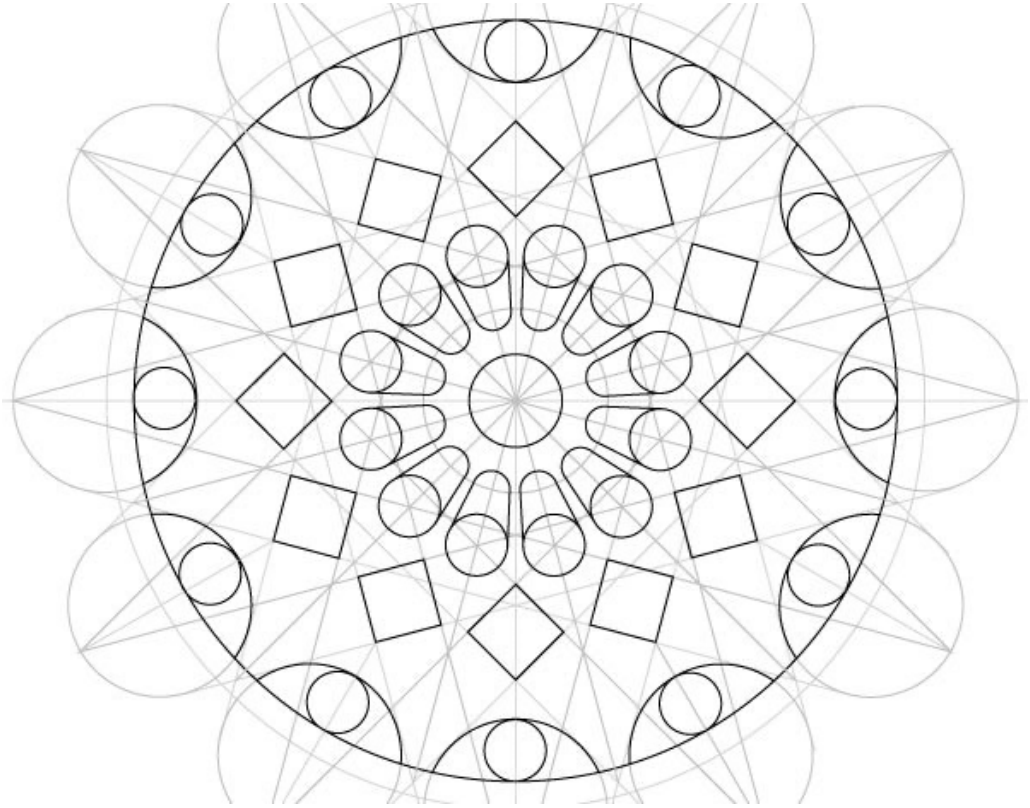

Image 30

Draw the circle that connects the outer point of the squares (image 31).

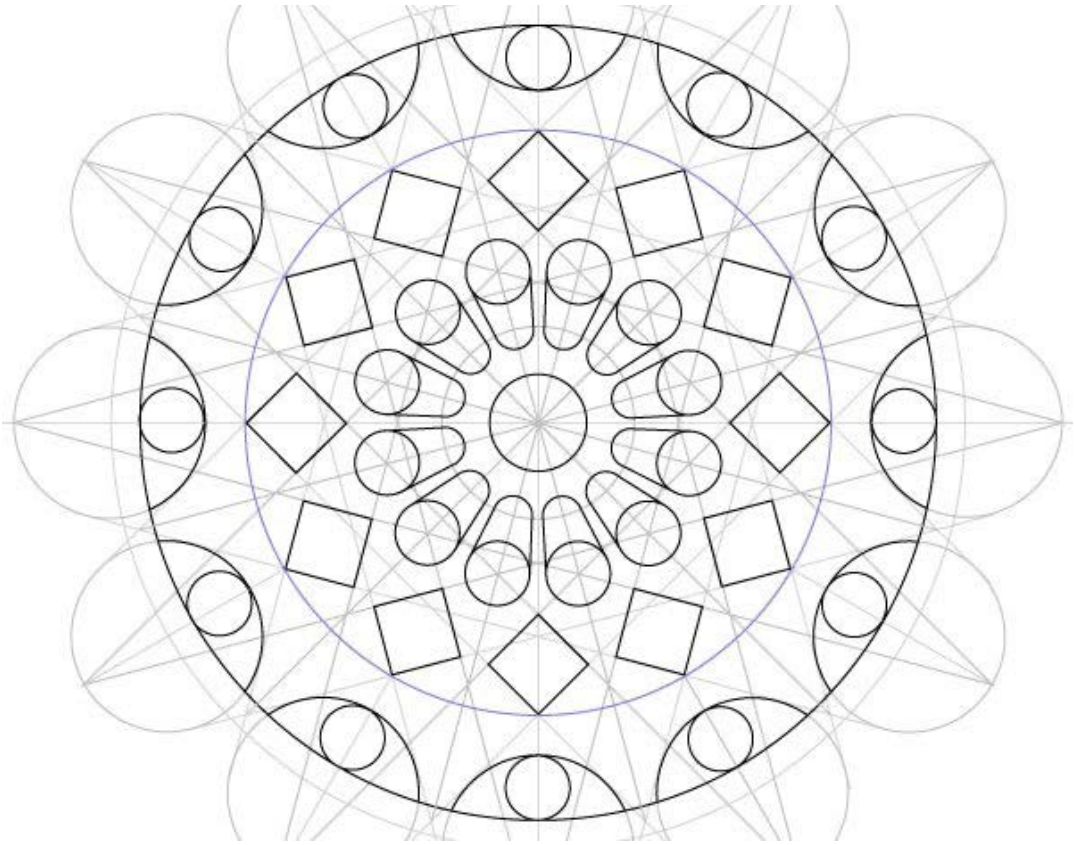

Image 31

Draw a circle as shown in image 32. Its centre is the intersection of this circle with a diameter of the window circle, and its radius is up to the point where two lines of the original dodecagram cross.

Image 32

Move the compass point to each of its cardinal points in turn to draw four more circles (image 33).

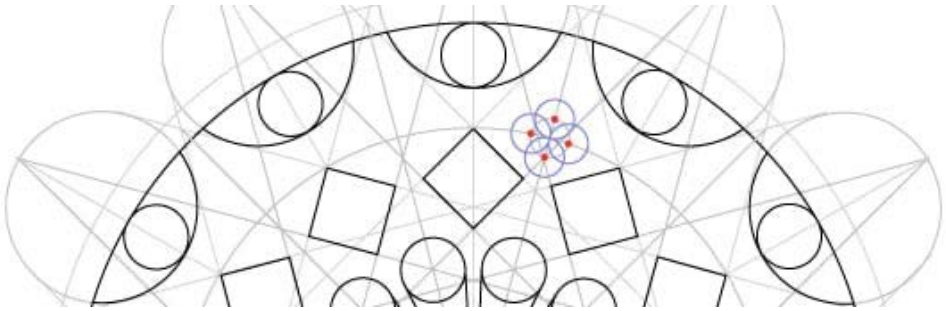

Image 33

Ink the outline of this quatrefoil shape, repeat the form 11 times (image 34).

Image 34

The finished window, here inked with different line thicknesses to create a visually pleasing hierarchy of shapes (image 35).

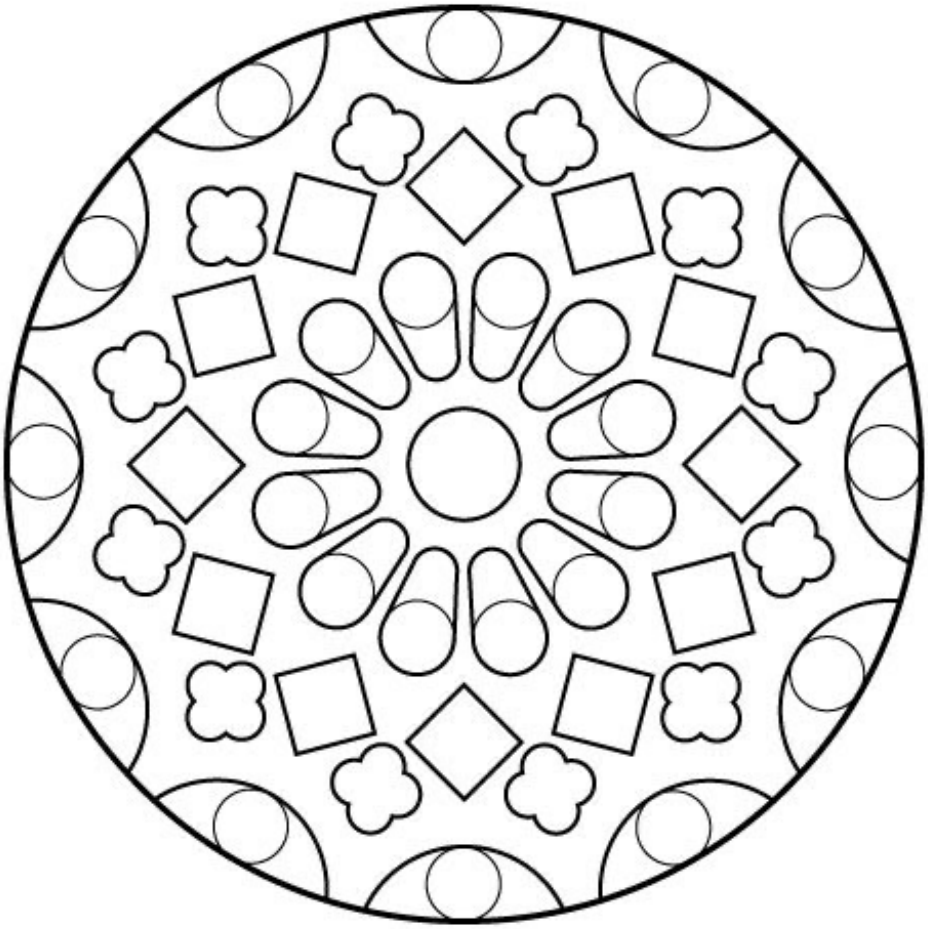

Image 35

Step 5 - Colouring

Time needed: 30 to 45 minutes

Colour to your liking... Each of these shapes can also be filled in with arabesques or figures to echo the feel of the original window (image 36).

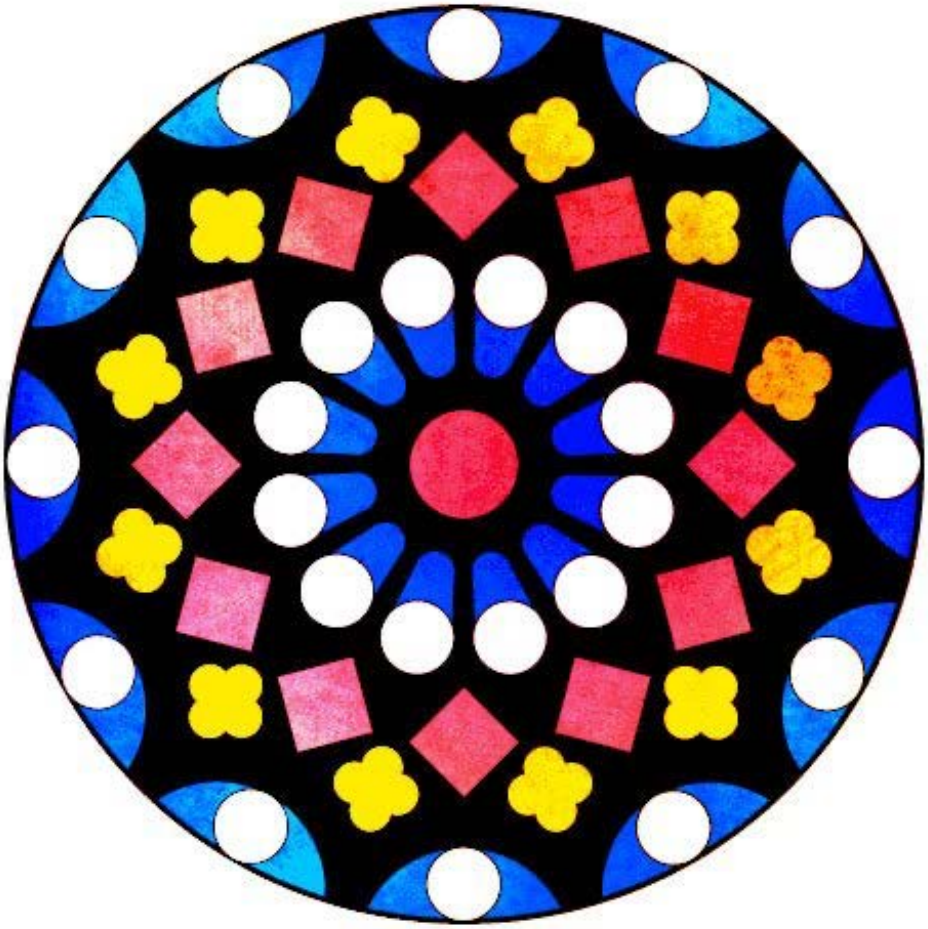

Image 36