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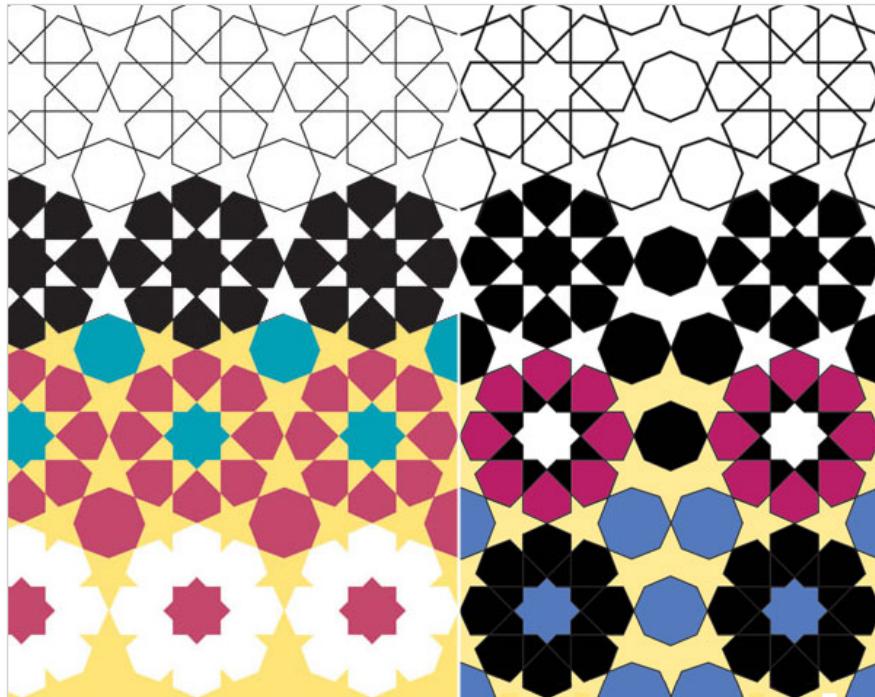
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Geometric Design: Two Variations on an Islamic Tiling Pattern

illustrator

by Joumana Medlej



What You'll Be Creating

Today we will sink our teeth into an intricate pattern that is nevertheless not too complicated to construct, being based on "fourness" (4, 8, 16). This is a highly classical Islamic pattern, and the fact it breaks down a surface into very small individual pieces also has a practical dimension, putting to use small fragments of material.

Eight-Fold Rosette Pattern

The rosette that is the central motif of this pattern can be drawn as a single stand-alone motif. To do this, draw a circle in a square and divide it into 8 (see **Dynamic Octagon in Circle**, in **Working with 4 and 8**), and then go on to divide it into 16, as shown in step 2 below.



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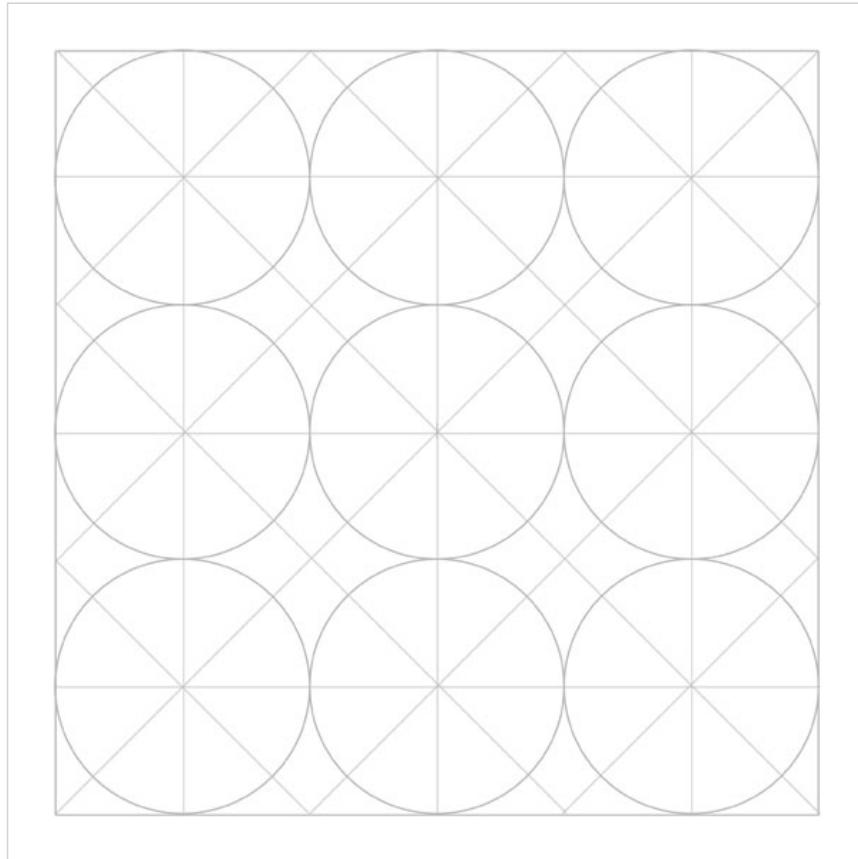
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Most books I could find outline this and seem to suggest that, in order to create a pattern, you should repeat this for each rosette on your surface. That is an absurd, time-consuming way of working and has an adverse effect on the overall accuracy.

Here you will find the proper method for creating a pattern, which is to draw a grid. Most of the lines will run through the whole grid, even if not continuously visible, so that it all holds together. When working tile by tile, it is much more likely to have many small deviations so that no true lines run through the entire design.

Step 1

Start by drawing a **five-circle grid** (see [Working with 4 and 8](#)). You can leave out the alternate diagonals, which we won't be using—only include those that divide the circle into eight. I am working with nine modules again, but there can be as many as you want, and the surface they fill doesn't have to be a square.



Step 2

Add the intermediate verticals and horizontals, so that each circle is inscribed in a square.

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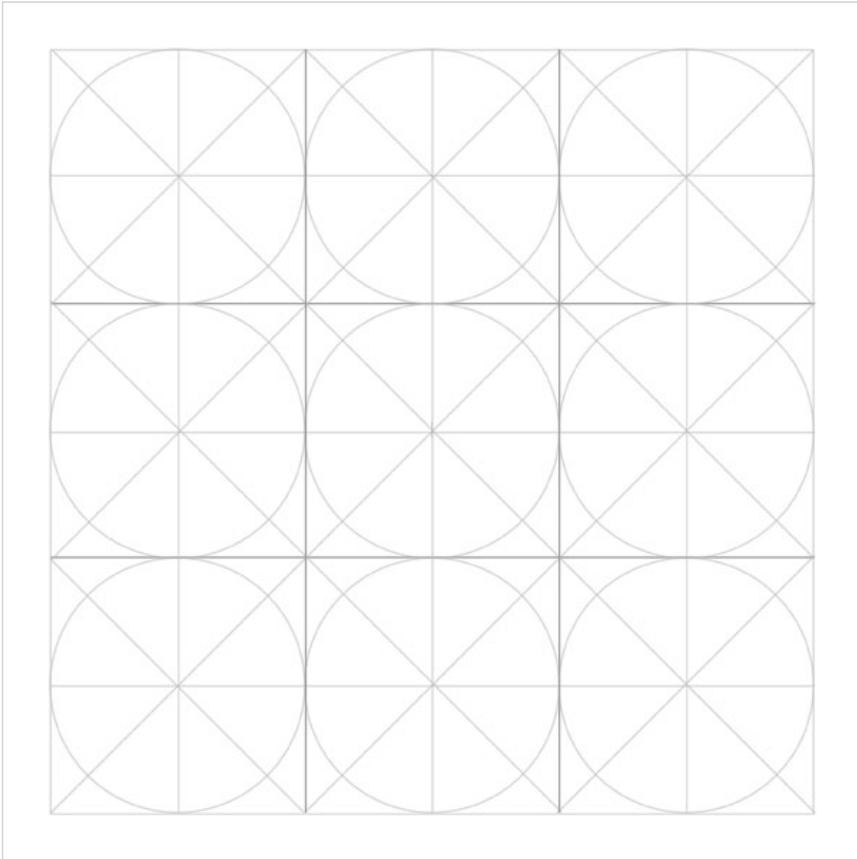
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Step 3

We now need to divide the circles in 16. Pick a square, place the dry point on one of its angles, and open the compass to go through its centre (which is also the centre of the circle). Make a mark on every straight line this arc crosses. Move to the next angle and repeat. This is enough to give us the four marks we need on the square we're working on, and two for the neighboring squares we'll address next.

Director - 4/8/2015

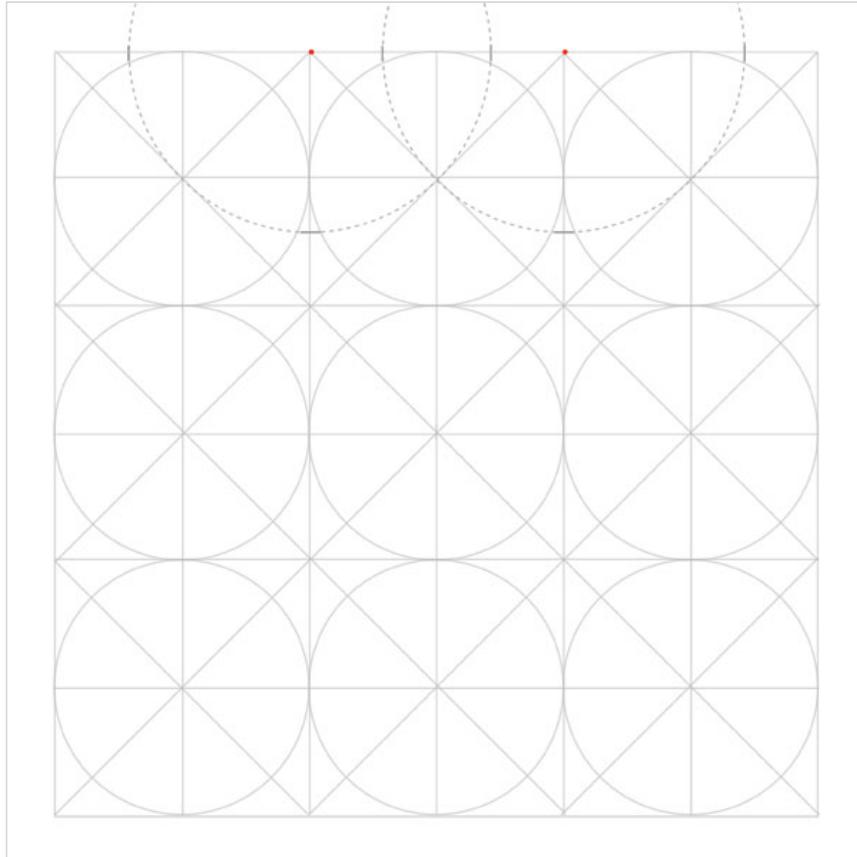
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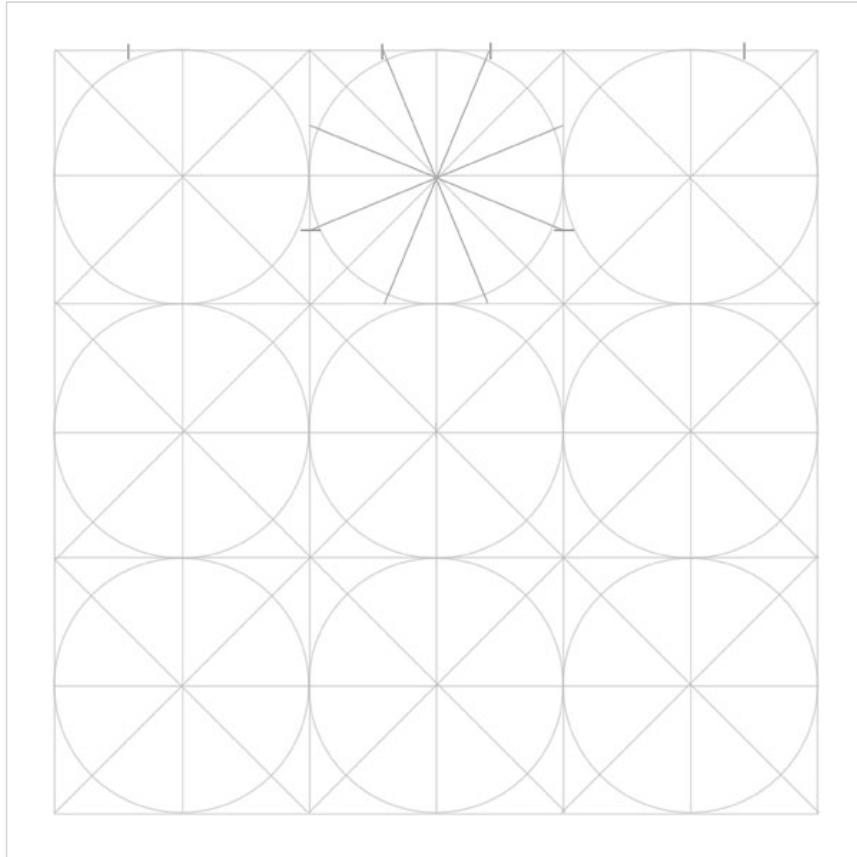
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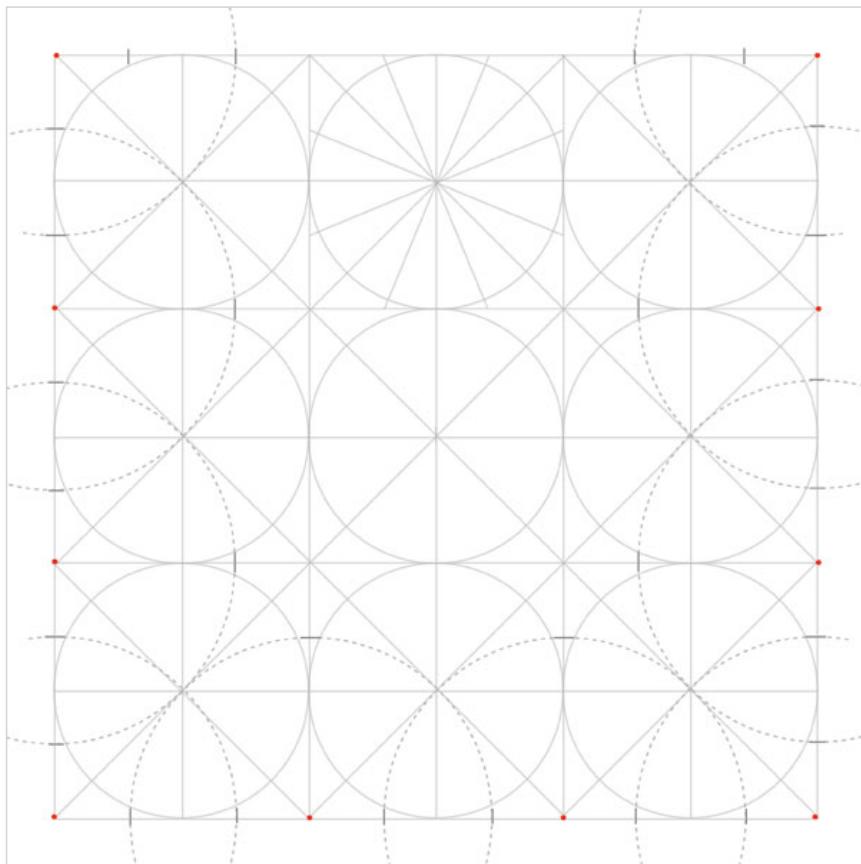
Step 4

Draw a line from these marks through the centre of the circle and all the way to the opposite side of the square. The circle is now divided in 16.

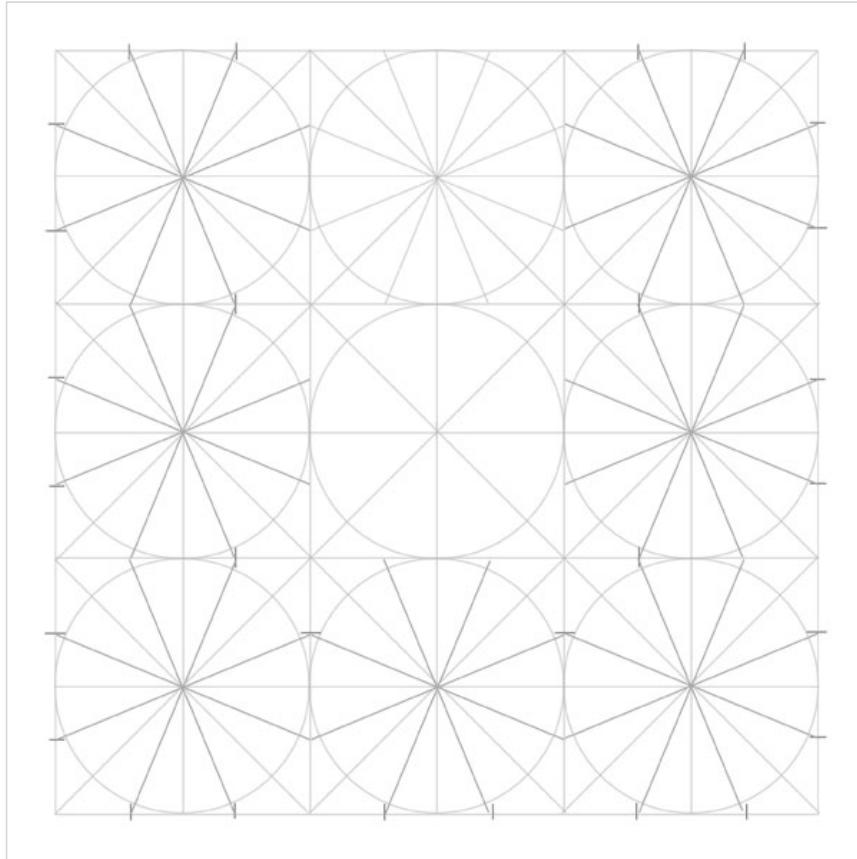


Step 5

Repeat all around to find at least four marks per square...

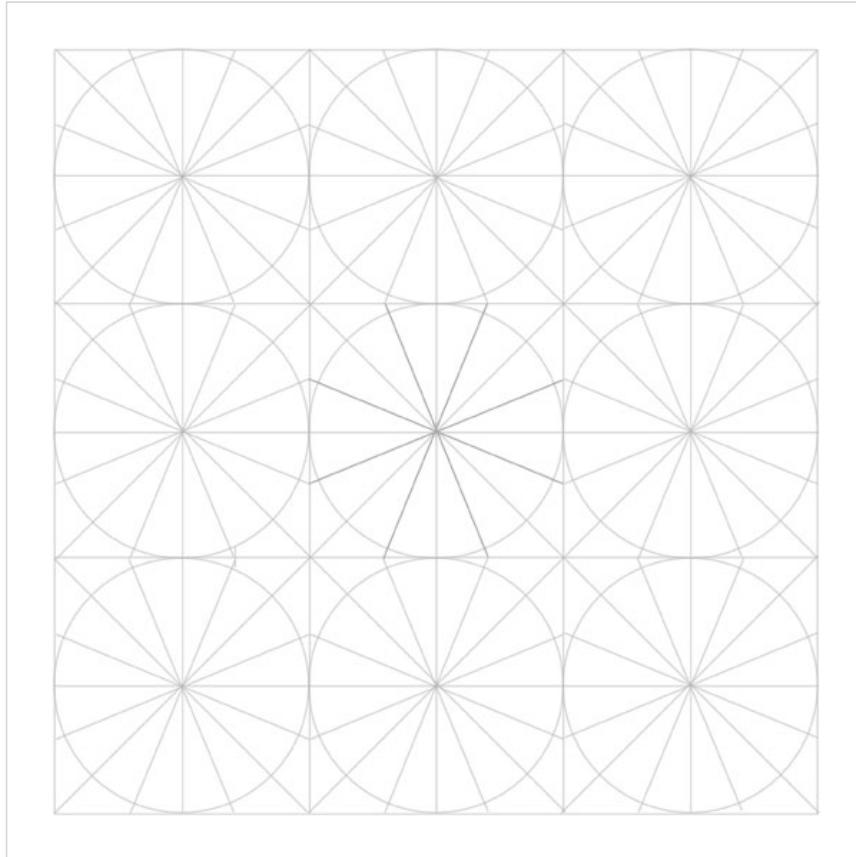


... and join to divide all the circles.



Step 6

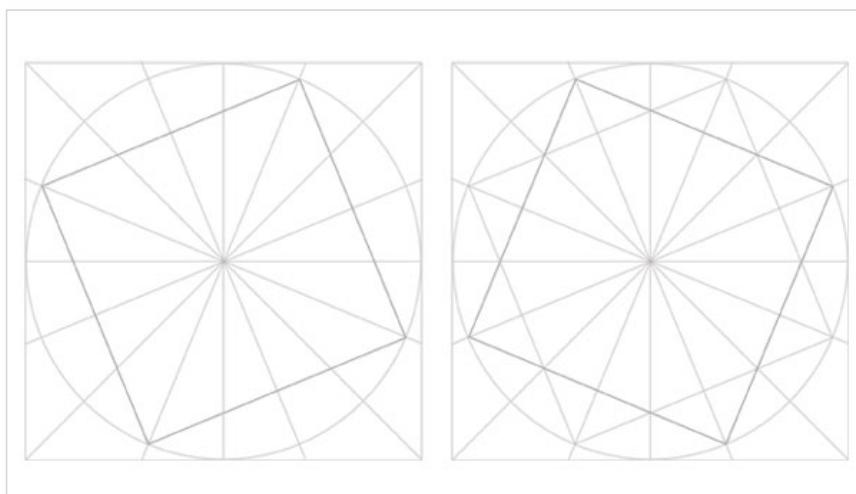
In this particular case (nine units), the central circle can then simply be divided by joining up the ends of the lines around it. If you have more units, you may need to repeat step 5 on more squares.



Step 7

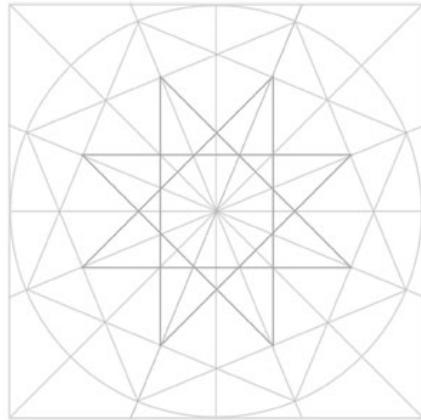
I will now zoom in on a single unit for clarity. At this point you may also find it easier to finish each unit individually. Once you are familiar with this pattern, however, it is recommended to work through the entire pattern whenever possible. By that I mean that wherever line segments align, draw them all in one swoop, with a single placement of the straight edge, lifting the pencil in-between.

Draw the following two squares in the circle.



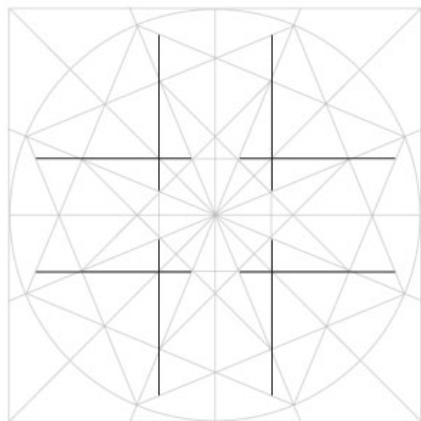
Step 8

Join the points where the squares intersect to draw the following octagram.



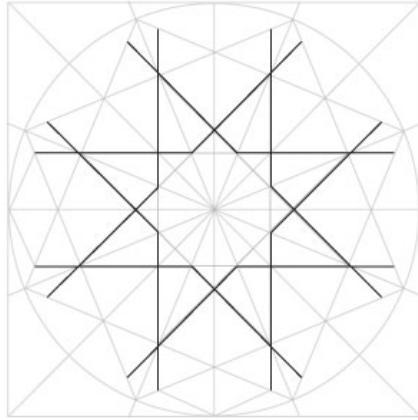
Step 9

We can now draw our final lines. Start with the vertical and horizontal lines, observing very carefully where they start and end, below: they start where the straight line meets the innermost diagonal, and end where it meets the outermost diagonal.



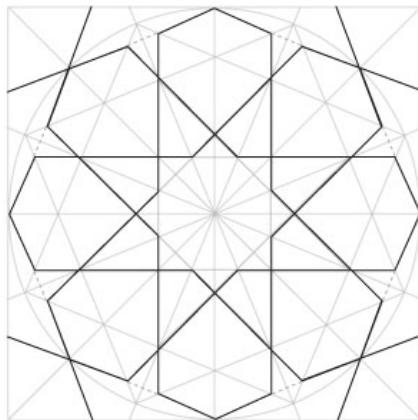
Step 10

With the previous in place, it is easier to find the diagonal lines. You can also rotate the paper 45° to see better, and repeat step 9.

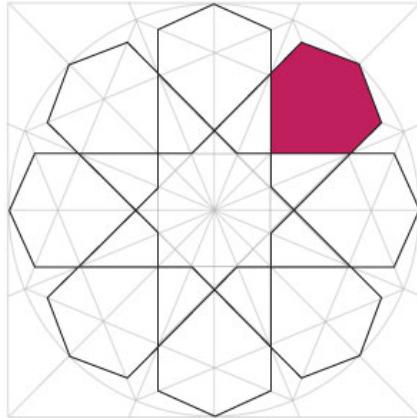


Step 11

Connect the loose ends to the points on the circle to complete the rosette. At the north, south, east and west, these points are also on the surrounding square, but that is not the case for the four diagonal corners. Note how, for these, the line extends past the point until it meets the square. This is important to define secondary shapes in the tiled pattern.

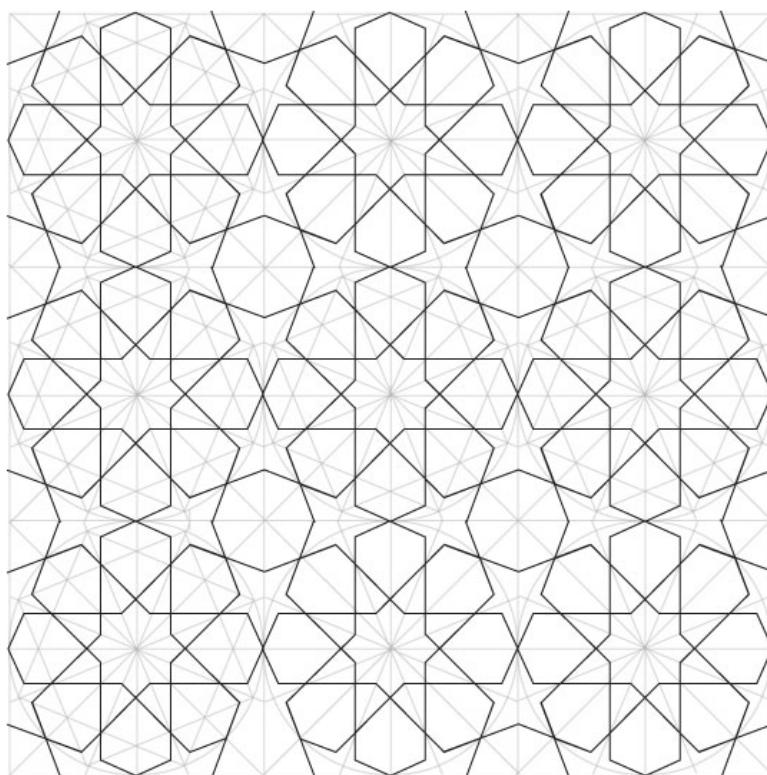


If you're only drawing a single rosette, you can end the lines on the circle and the shape will be self-contained. The angular shape highlighted in red is called a *soft*.



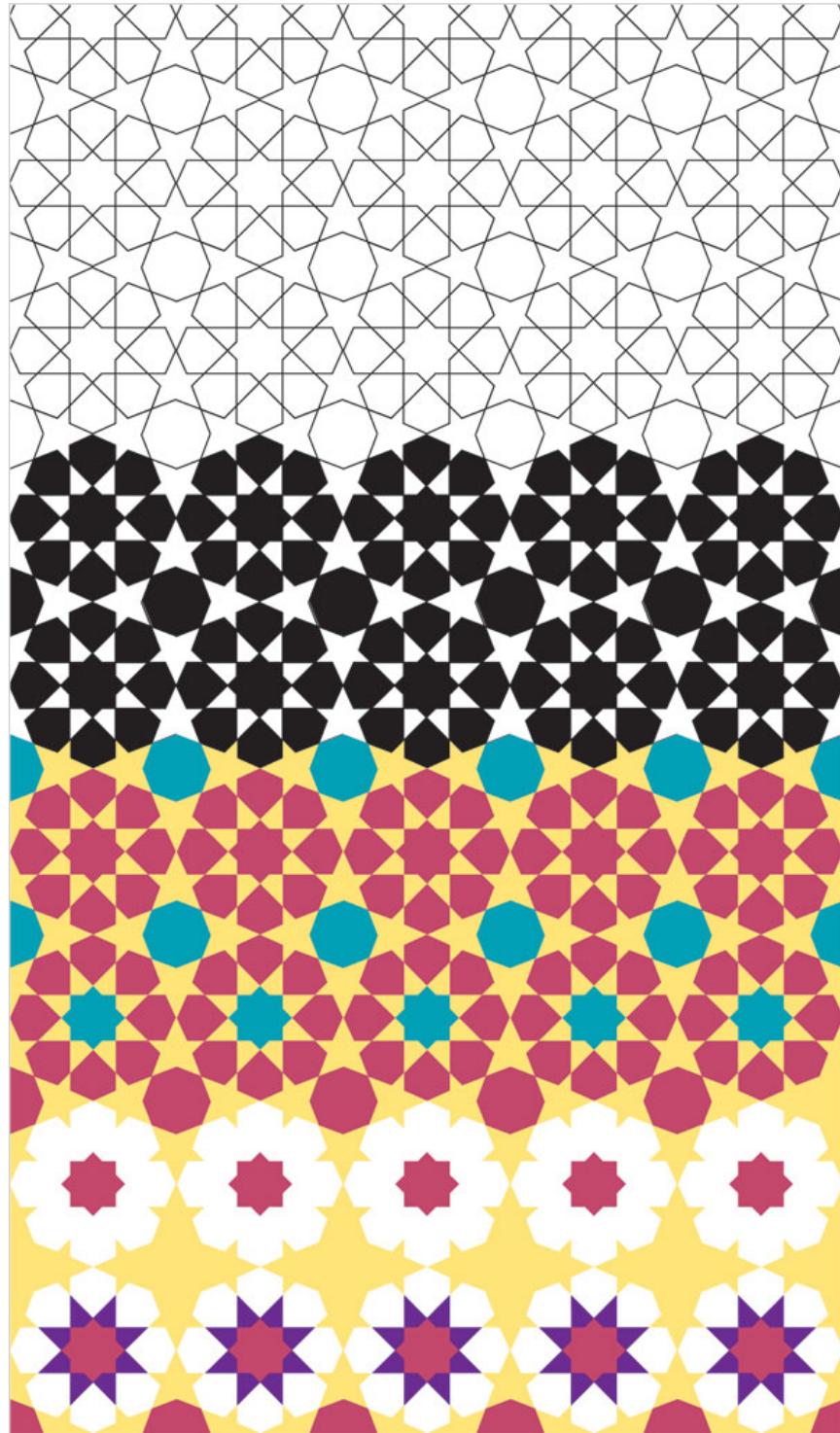
Step 12

Repeat steps 7 to 11 throughout your pattern. When tiled like this, we can see that the extra lines we added at the diagonal corners have defined dynamic octagons surrounded by irregular five-pointed stars!



The pattern, in its essential form, is now complete. At this stage it could be given an additional interlaced effect (see [Knots and Weaves](#)), or coloured. The number of colours and how they are distributed can radically change the way it looks; a mere handful of examples are shown below. I attach to this lesson a

downloadable .png with light outlines which you can print out to experiment with colouring, if you fancy!

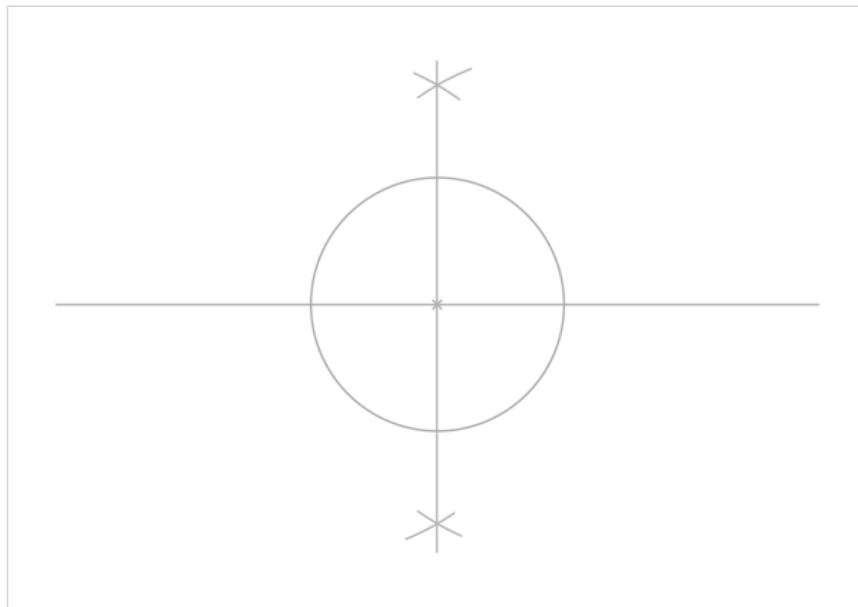


Eight-Fold Rosette in a Rectangle

Here is a variation on this pattern where the grid is formed of **golden ratio rectangles**, which breathes some space in-between the rosettes. The construction of the rosette is the same, once we get to it, but we're going to first construct this derivative grid, hence the number of steps.

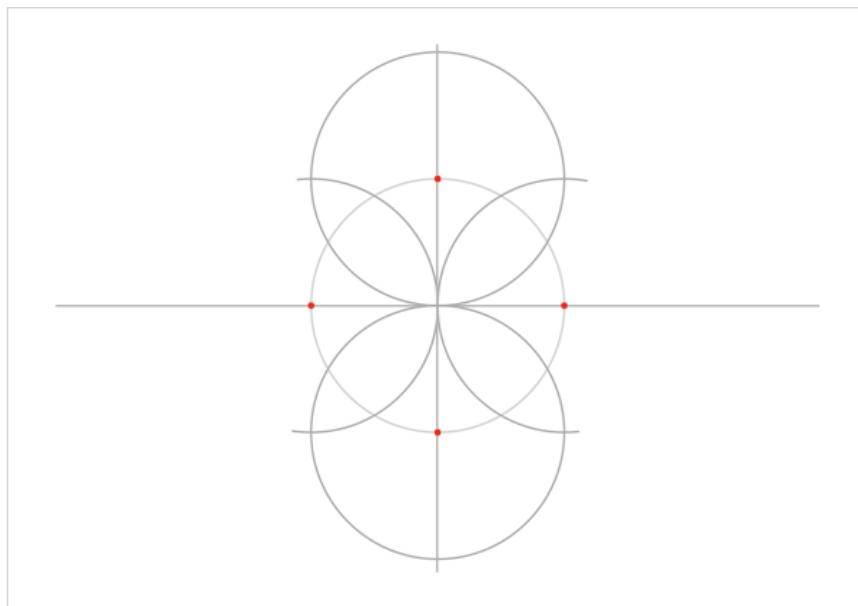
Step 1

Start as if to draw a five-circle grid, with a horizontal line, a circle on it, and the perpendicular through the circle's centre.



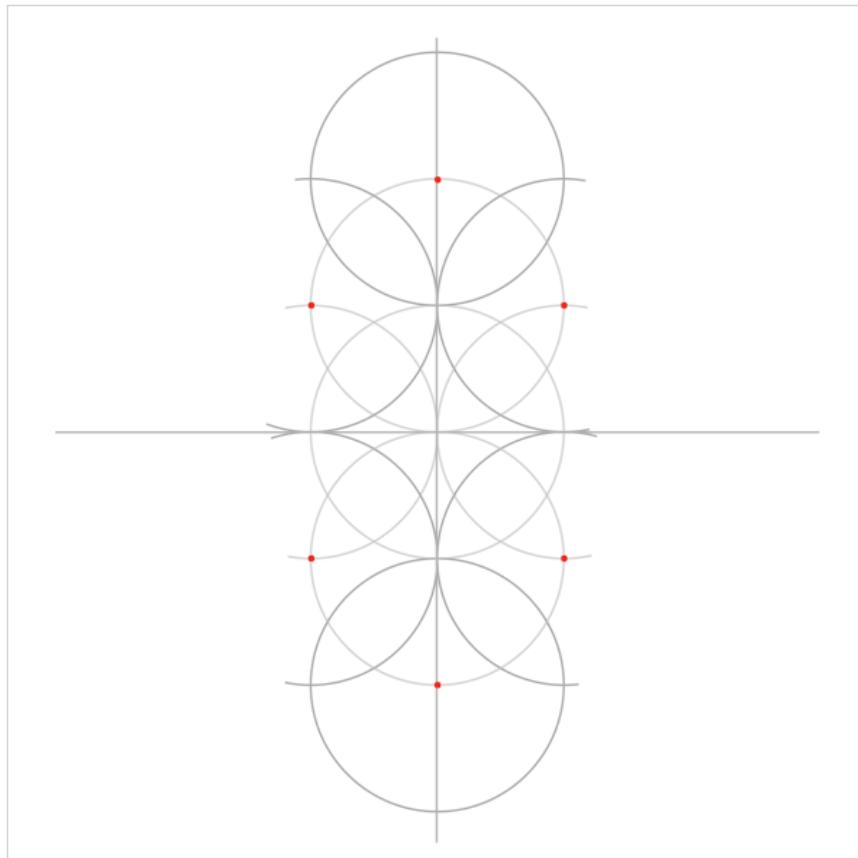
Step 2

With the same compass opening, place the dry point on the north and south points of the circle, and draw two other circles. Then move it to the east, then west points, drawing just enough of an arc to intersect the previous two circles. This is to keep the paper as uncluttered as possible, because we'll have a lot of construction lines later.



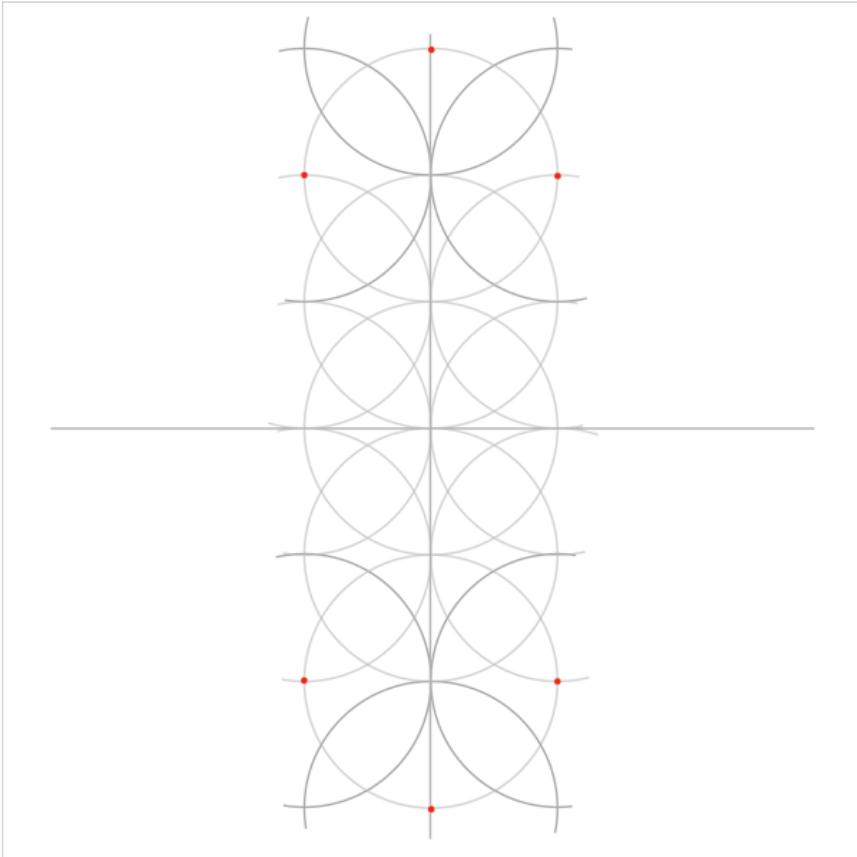
Step 3

Add another circle above, and one below, and the arcs in-between (see red dots for compass placement). At this point we have three tangent circles arranged vertically, so we're going to stop here (just as we usually stop at three by three circles in the five-circle grid) but in reality you can extend this at will. The next step will be to simply mark the last intersections we need to carry on working.



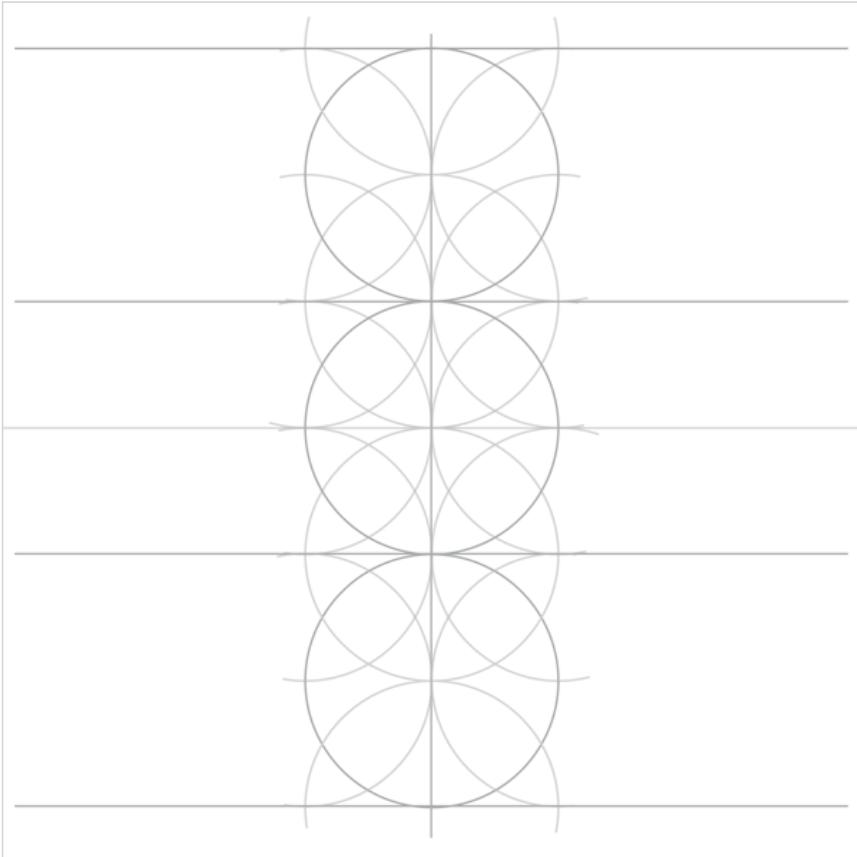
Step 4

Finish this part by adding the arcs below.



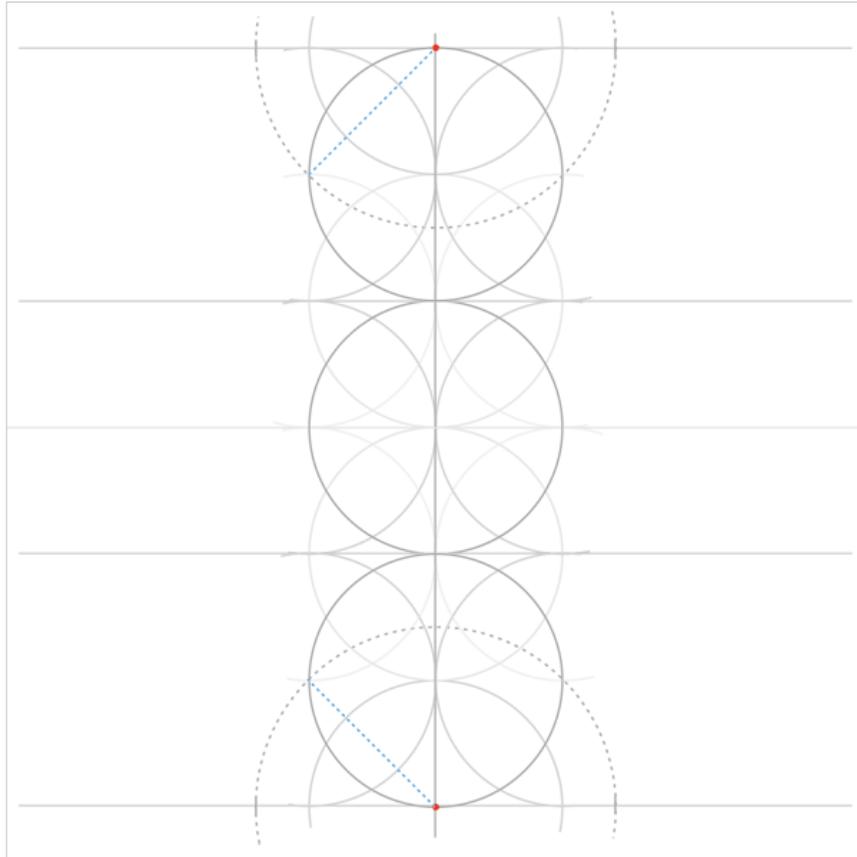
Step 5

We will now define the golden section rectangles that make up this grid. Join the intersection points around the three main circles to draw more horizontal lines. The original horizon line plays no further role in the construction, so rub it out or ignore it.



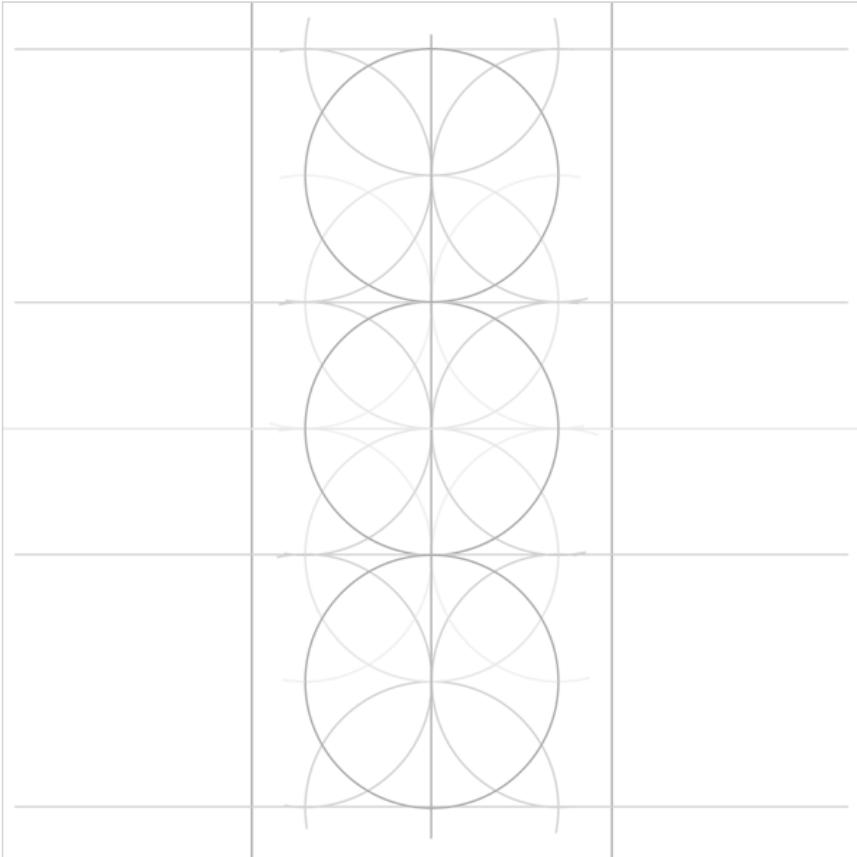
Step 6

With the compass opening shown below, mark two points on the top line.
Repeat on the bottom line.



Step 7

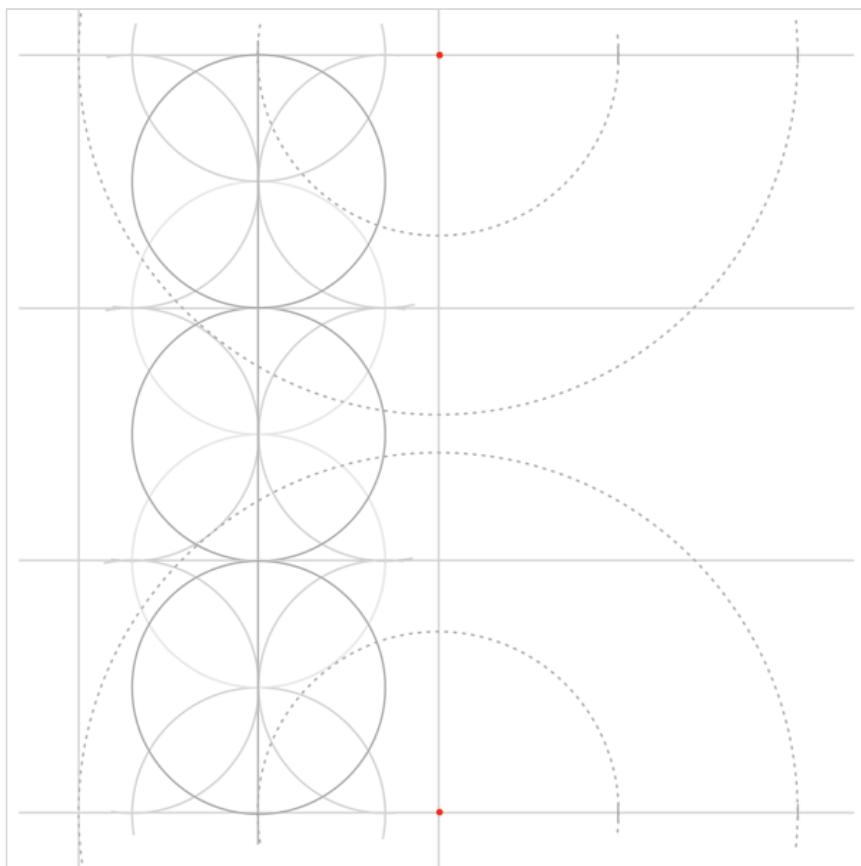
Join these points. We have the first column in our grid, with three circles inscribed in three rectangles.



Step 8

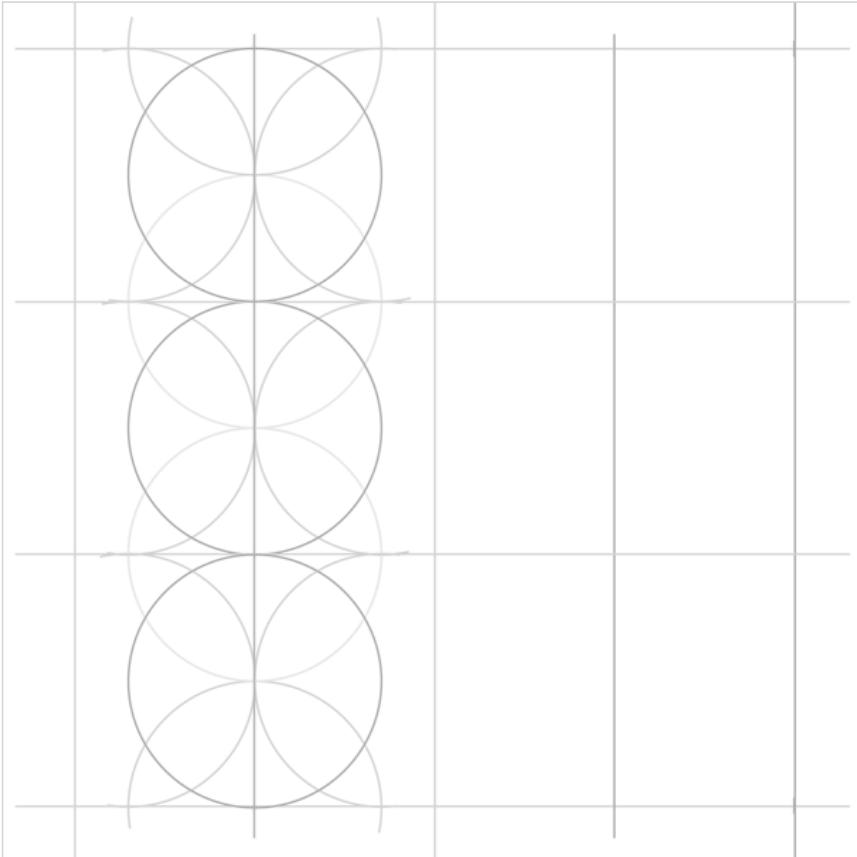
Here I am repeating the column only once, but follow these steps to create as many as you need to fill your surface. With the point of the compass placed as shown, measure the width of the rectangle and mark that on the other side, and then do the same to mark the placement of the middle vertical, where the circles will be centered.

Repeat on the bottom line.



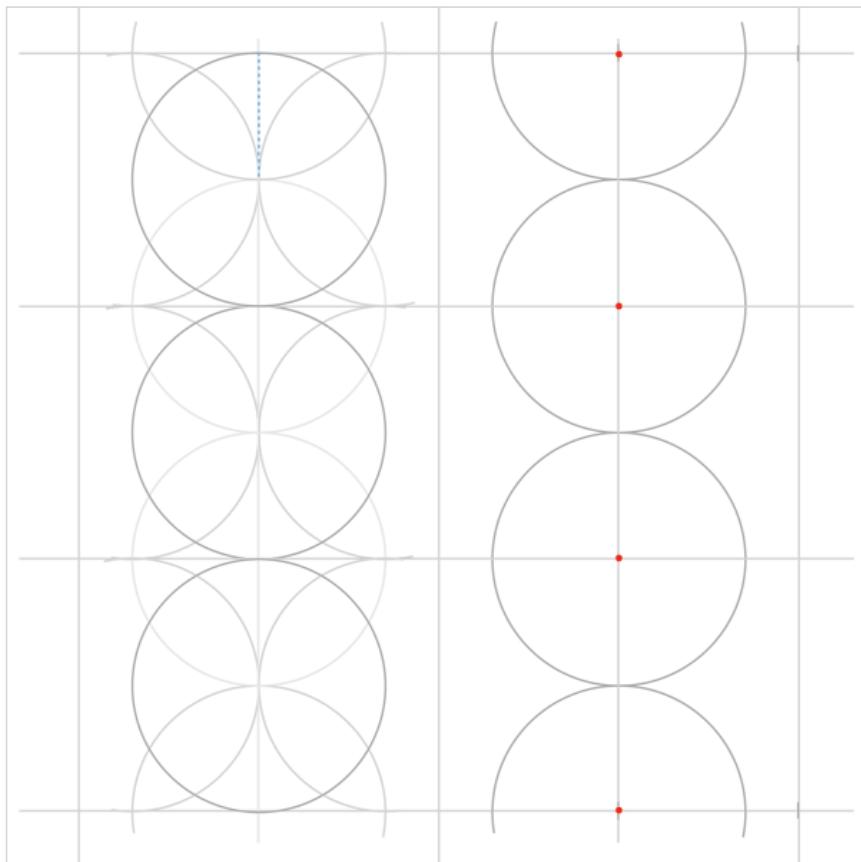
Step 9

Join.



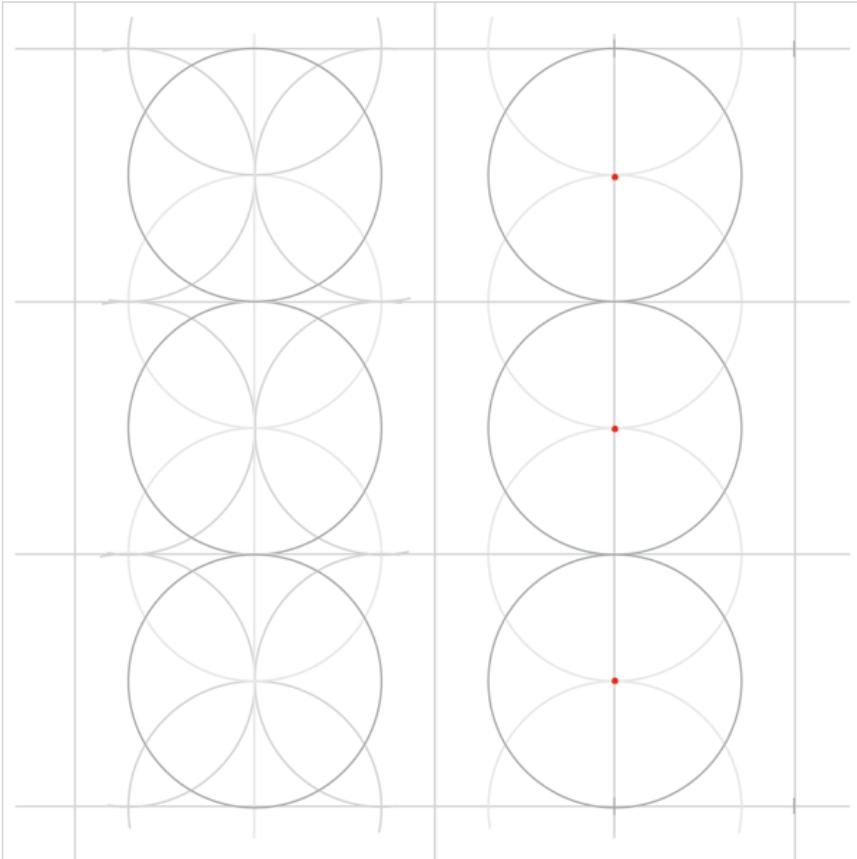
Step 10

Return the compass opening to the original circle radius, and use the following intersections to draw the intermediate circles and arcs.



Step 11

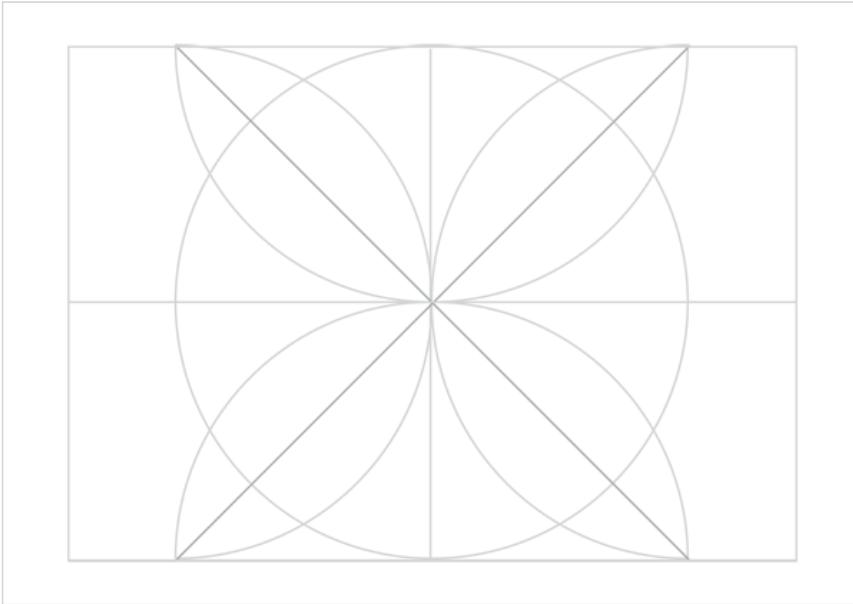
Now draw the second set of three circles.



Step 12

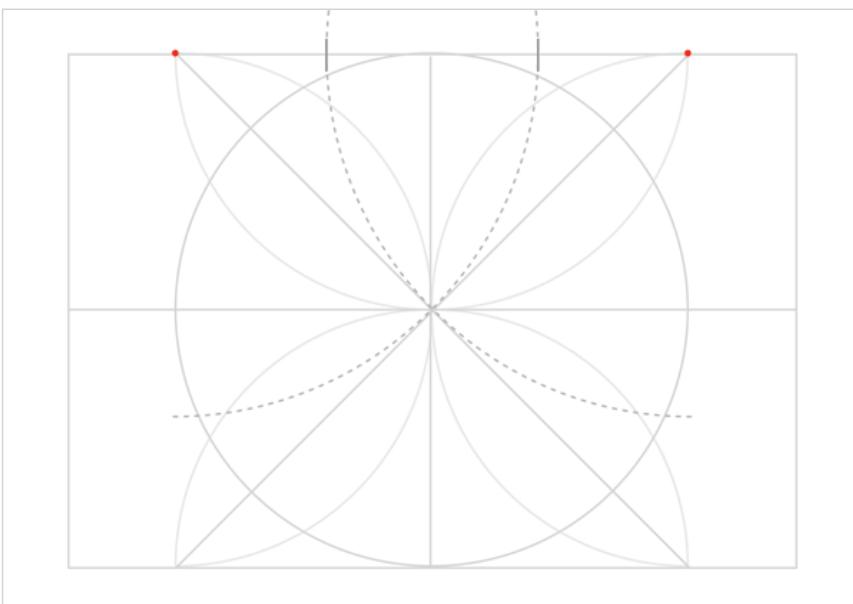
From this point on we're working within each unit individually, so I'm zooming in on a single rectangle. You'll see similarities with our work on the pattern in squares, as well as some additional steps. Remember that the four "petals" around each circle define a square. You can draw its vertical sides if it helps. I'm leaving them out for the sake of clarity, since they're not going to be used.

First, draw the diagonals joining the tips of the "petals".



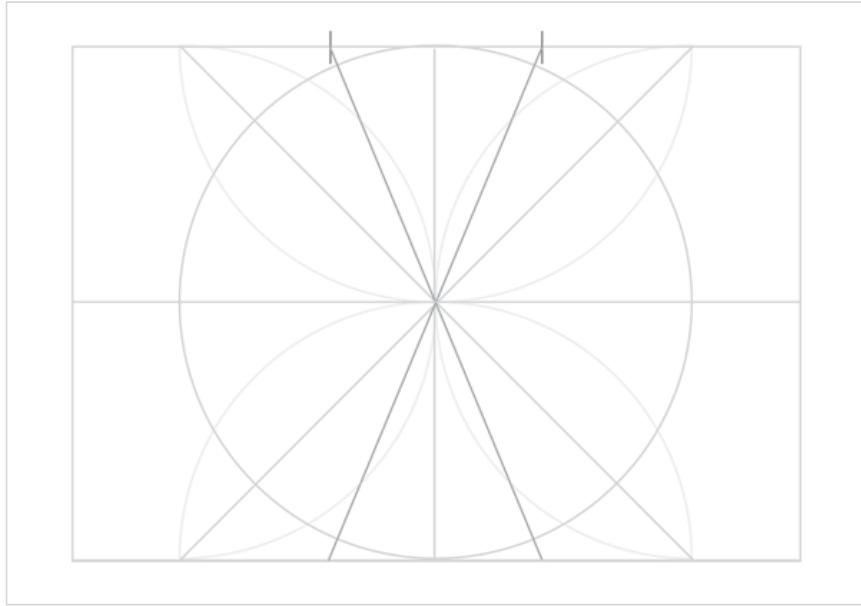
Step 13

With the dry point on two of the tips, opening to the centre, make two marks on the side of the rectangle.



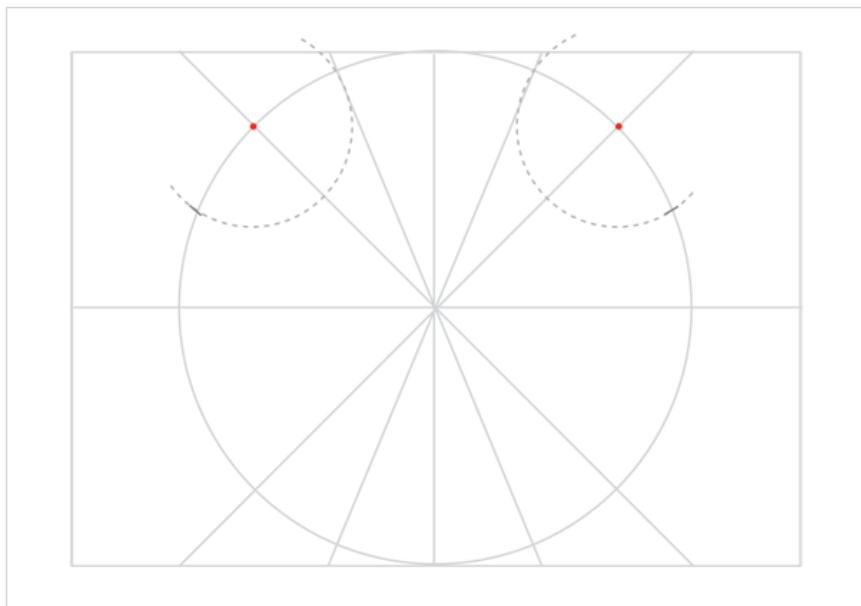
Step 14

Draw the line from each mark, respectively, and through the centre. We're dividing the circle in 16 again, and only need two more points. Since I decided to omit the sides of the square, I'll use a different way to find them.



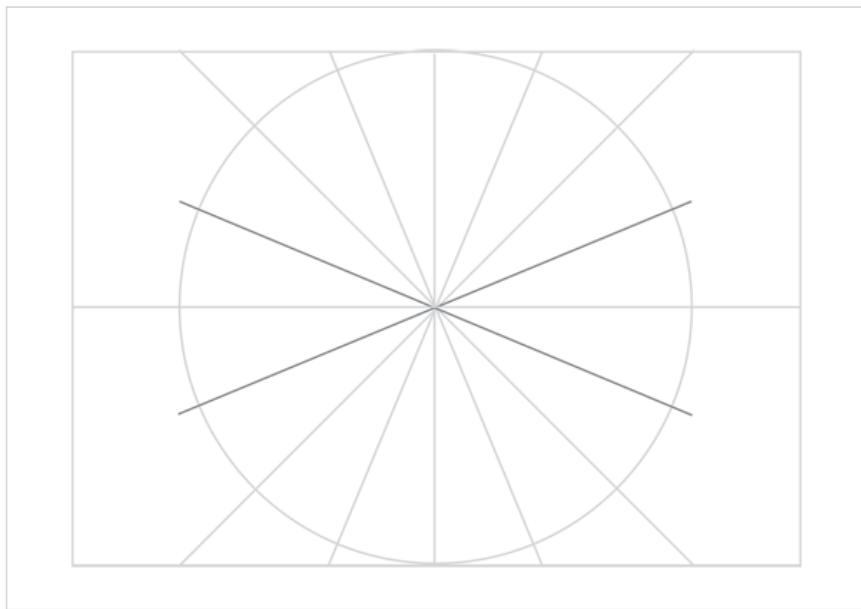
Step 15

Use the compass again to transfer the distances below accurately.



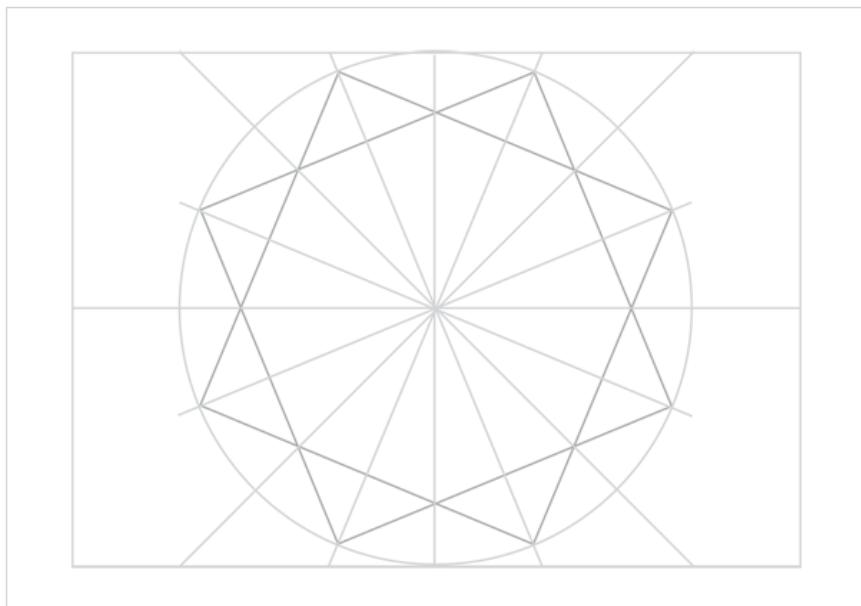
Step 16

Draw the two missing lines.



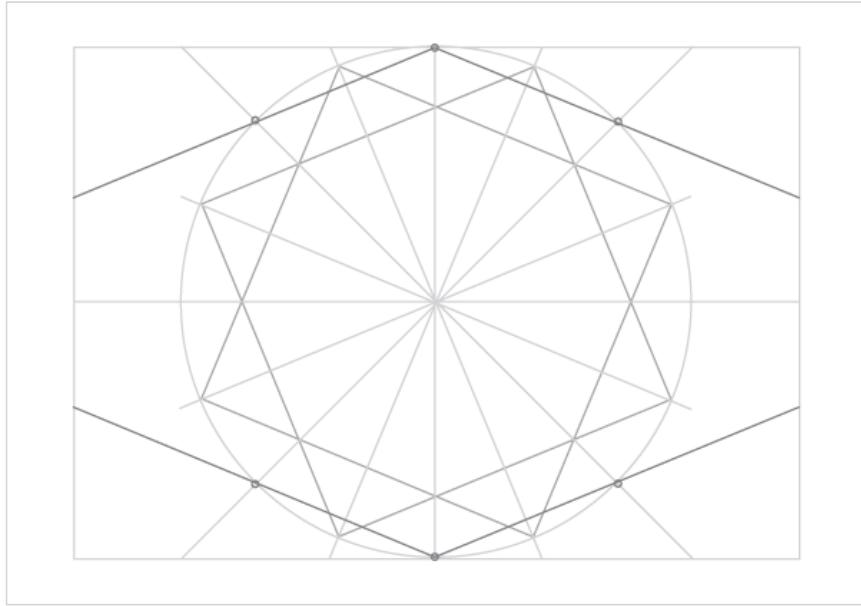
Step 17

Draw the two tilted squares.



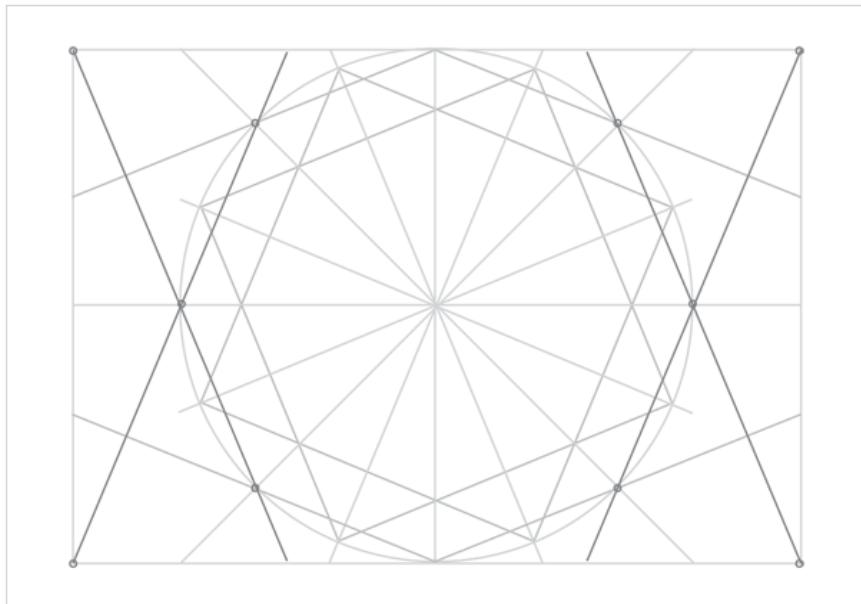
Step 18

This is a new element: Draw the lines that run through the points circled below.



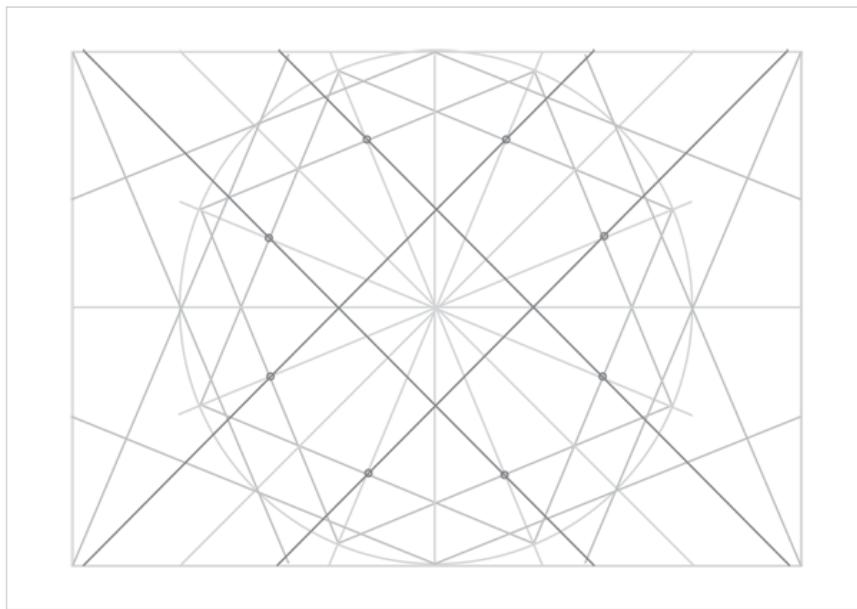
Step 19

Repeat with these points.



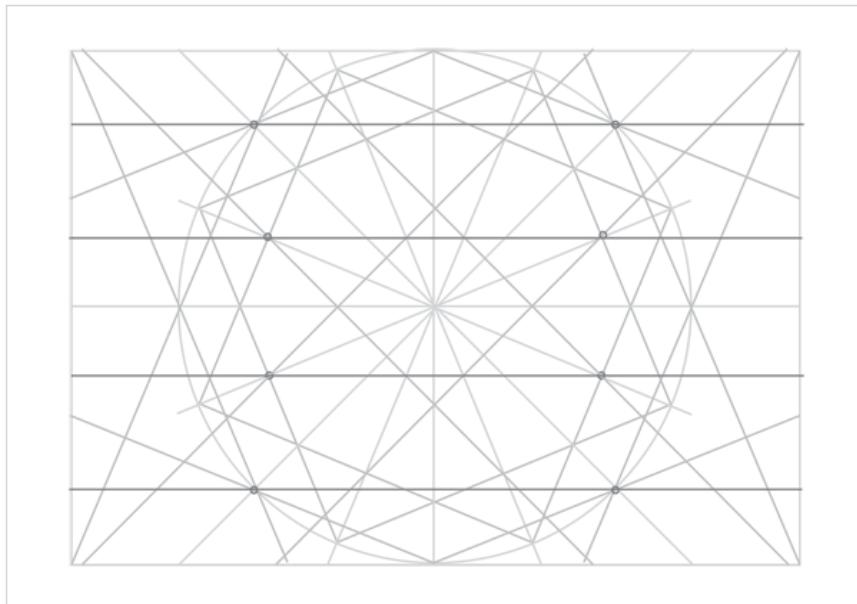
Step 20

Repeat with these points.



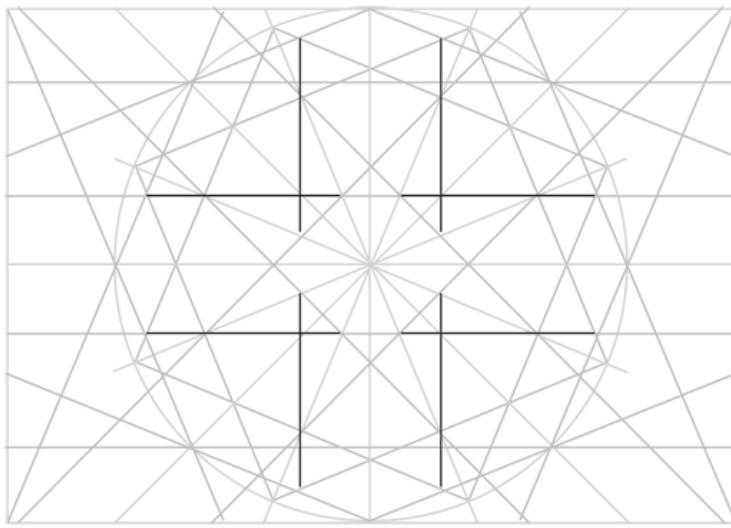
Step 21

And finally, repeat with these.



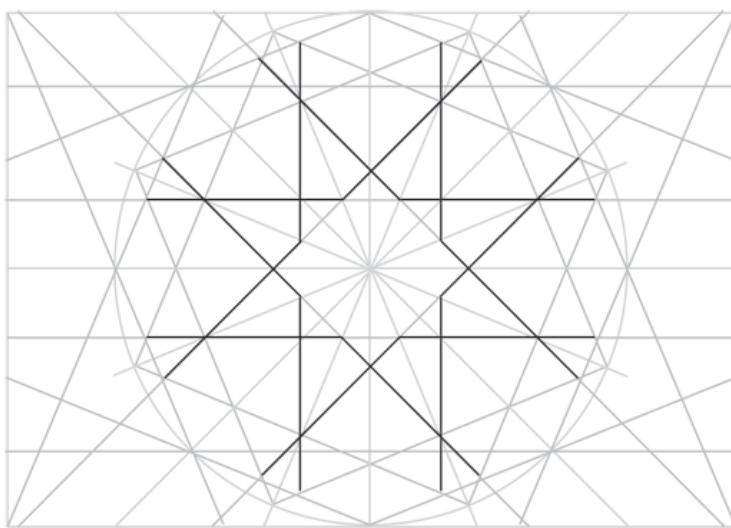
Step 22

We can now start inking! Begin with the easy-to-find vertical and horizontal lines, as with the previous pattern.



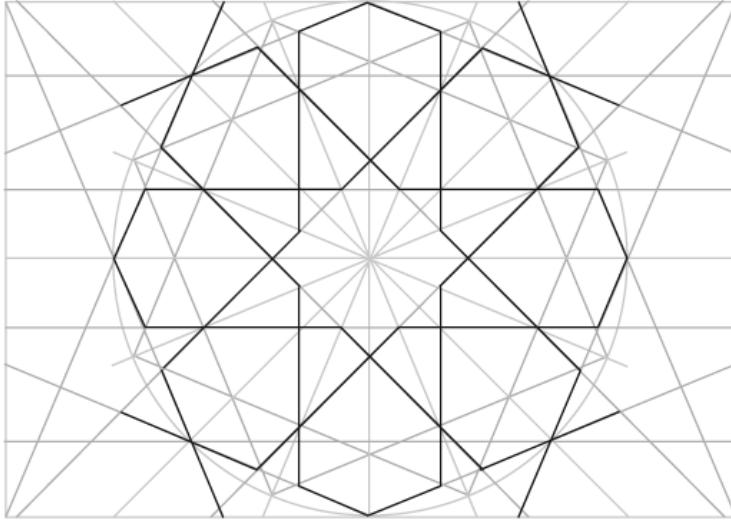
Step 23

Then their diagonal counterparts.



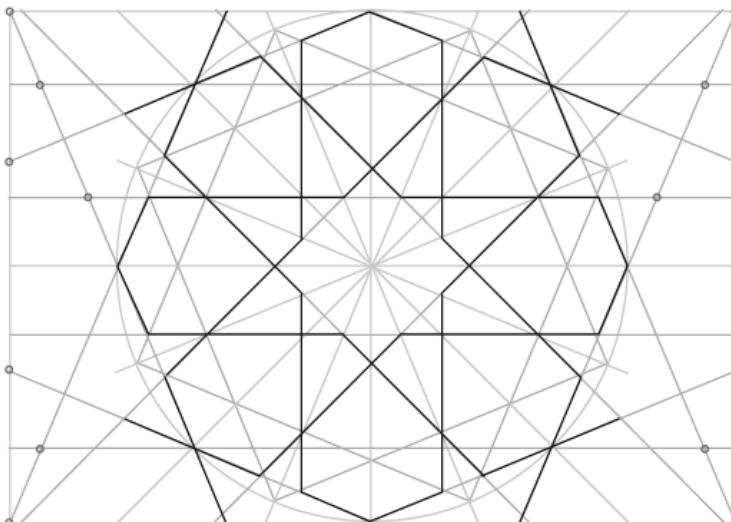
Step 24

Complete the rosette, not forgetting to extend the corner lines. So far it's all familiar.

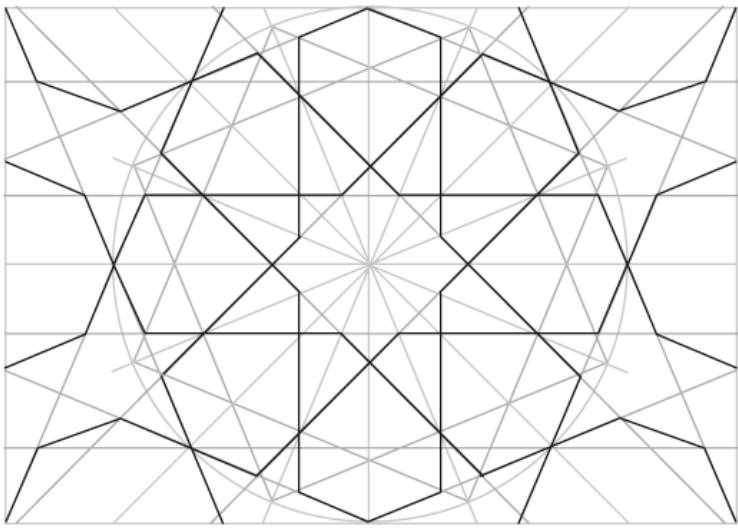


Step 25

Next, we'll ink the secondary elements. Note carefully the points involved, as there are no guidelines joining them.

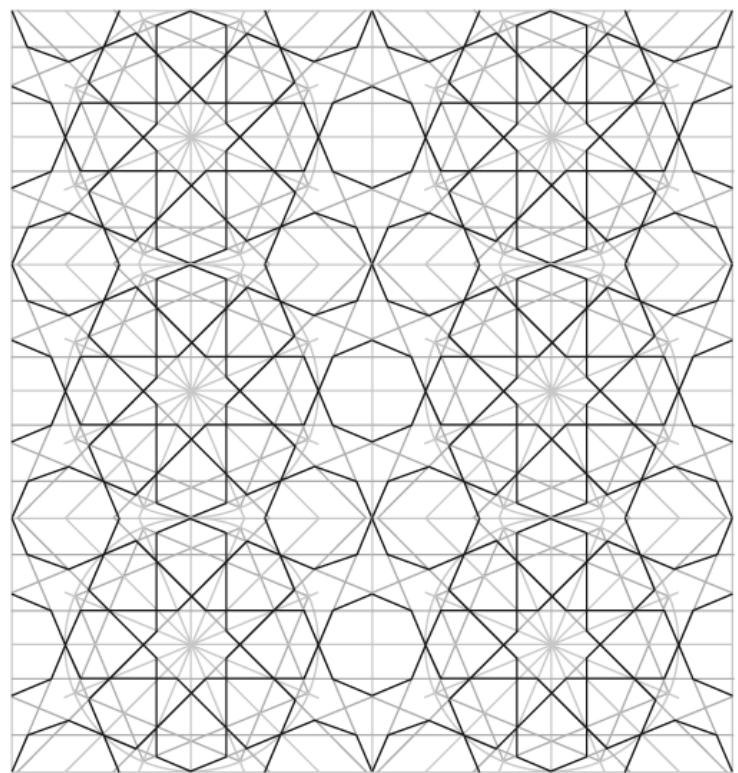


Join these points as follows.



Step 26

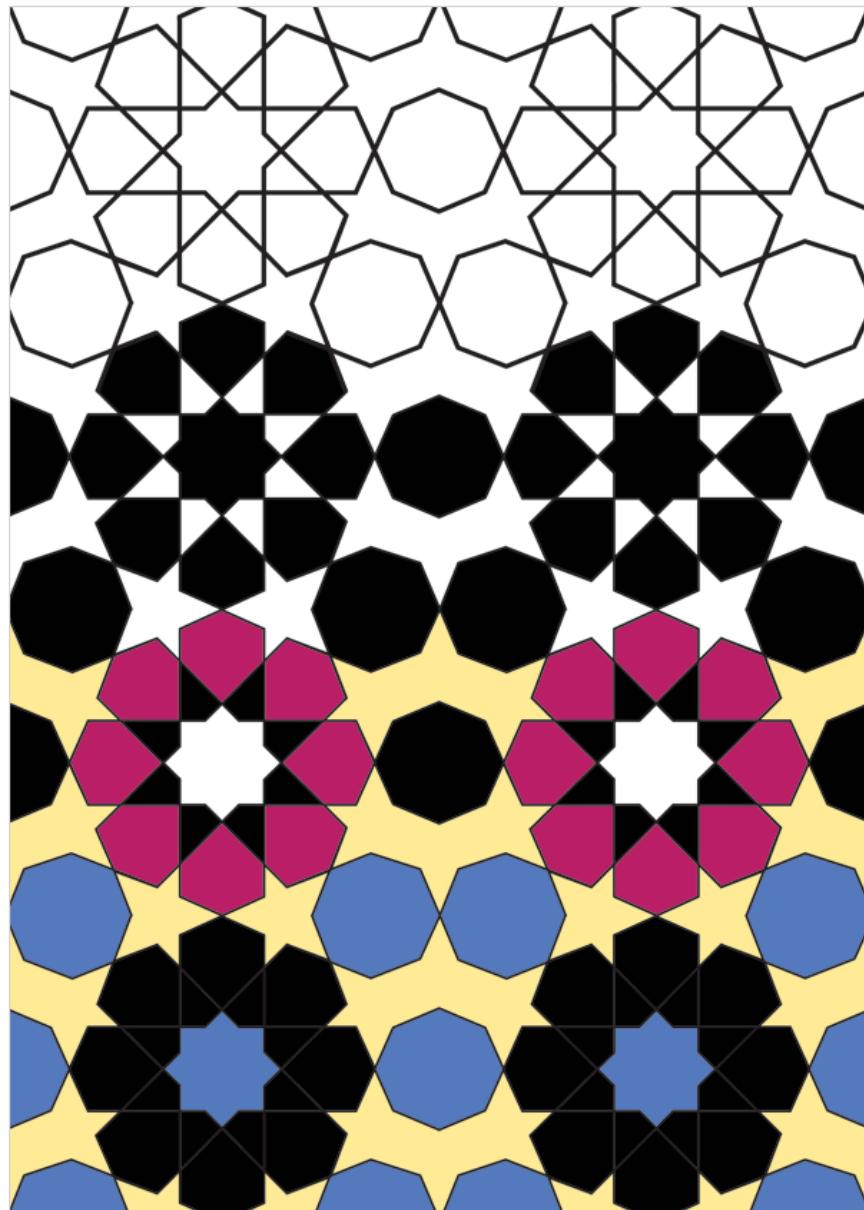
Repeat throughout the pattern!



Notice how the rosettes are still close together vertically, but horizontally the extra space has created a different patterning, with the same interlacing or colouring potential. Note that the use of the two variations is not an either/or

scenario: picture for instance two areas of rosettes in a square, separated by a single column of rosettes in a rectangle.

Similarly, although we've been working in a column, with horizontal rectangles, this can be done in rows, with vertical rectangles. There is no limit to what can be done with a single pattern like this one.



Did you know there are variants of this rosette with 10, 12, and even 92 and more branches?! Now there's a project... Next month we'll work with a different radiating motif, originating in another art tradition.

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