Easy & Profitable Designs for Decorative Engraved Concrete

A Step-by-Step Layout Guide

Engrave-A-Crete

www.EngraveACrete.com

1-800-884-2114

Welcome!

Geometric patterns are among the most pleasing designs used to enhance concrete surfaces.

In this publication, we will explain how to use the Engrave-A-Crete Trammel Point/Edge-Marker Kit. It is a simple, but highly accurate, tool that enables you to lay out geometric patterns ranging from simple to complex.

SQUARING UP:

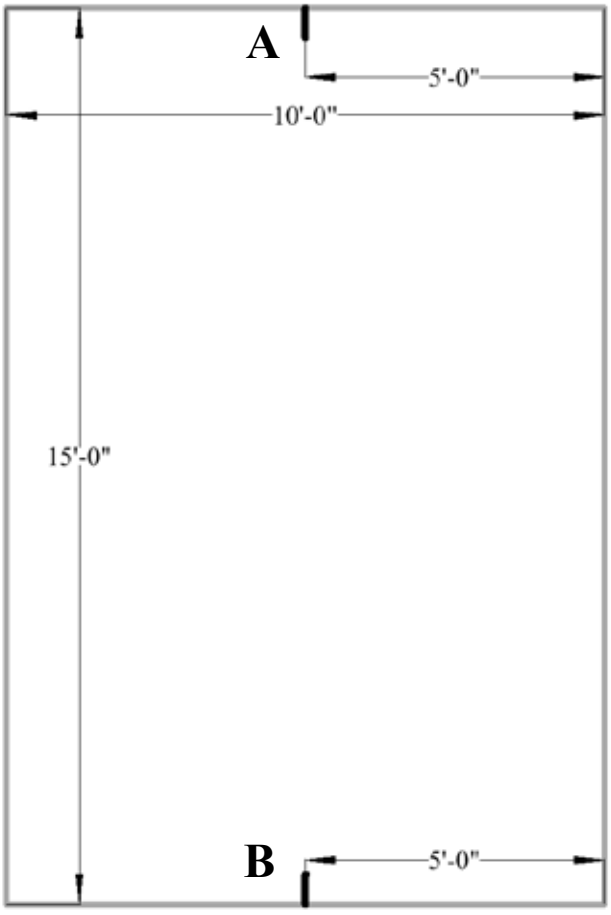
Squaring up a job is a prerequisite for cutting most geometric patterns.

Decorative concrete installers may be tempted to grab a framing square and set to work to square up a large area. Using a framing square for large areas is NOT an accurate method due to progressive error over distance, and that inaccuracy will adversely affect even simple patterns.

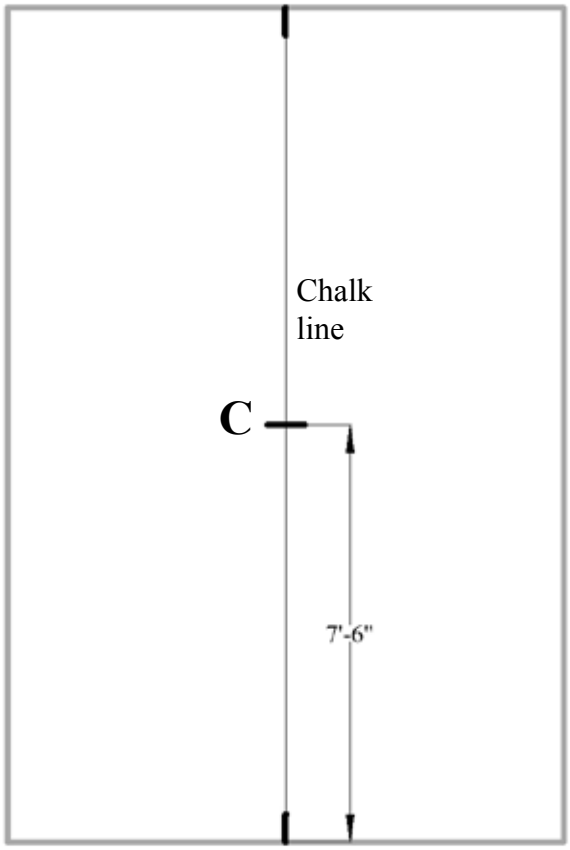
For instance: If your string line is even 1/16 inch off at the end of the square (24 inches), your line will be 5/16" out-of-square at 10 feet... 3/4" out-of-square at 25 feet... 1-9/16" at 50 feet... 2-5/16" at 75 feet... and a whopping 3-1/8" out-of-square at 100 feet.

Here, we explain how to square up a surface using the Engrave-A-Crete Trammel Point. This process requires very little mathematical calculation, and is almost foolproof.

It produces a highly accurate alignment reference for all of your jobs.



1) Divide the slab in half and place marks A and B at the center of each end. Use soap stone to make your marks, as it is easily erasable.



2) Snap a chalk line between points A and B. Then create line C at the center of that chalk line. Do not use red chalk, as it is permanent and can be seen through the stain and epoxy. Florescent orange chalk is preferred, with blue chalk being a second best option.

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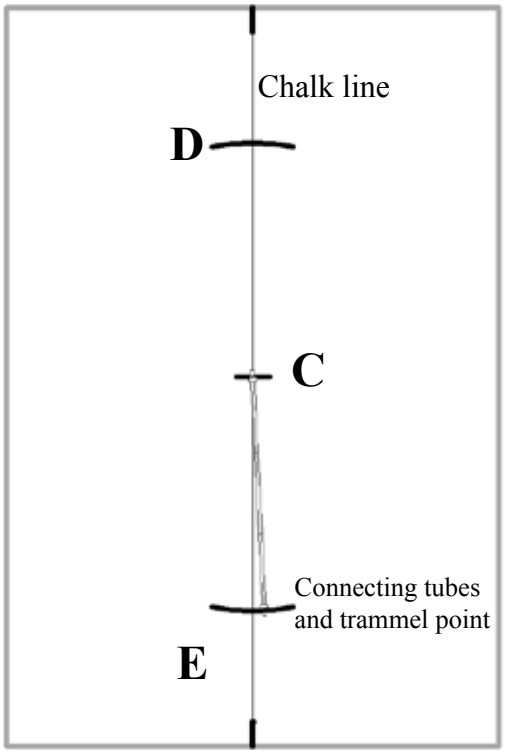
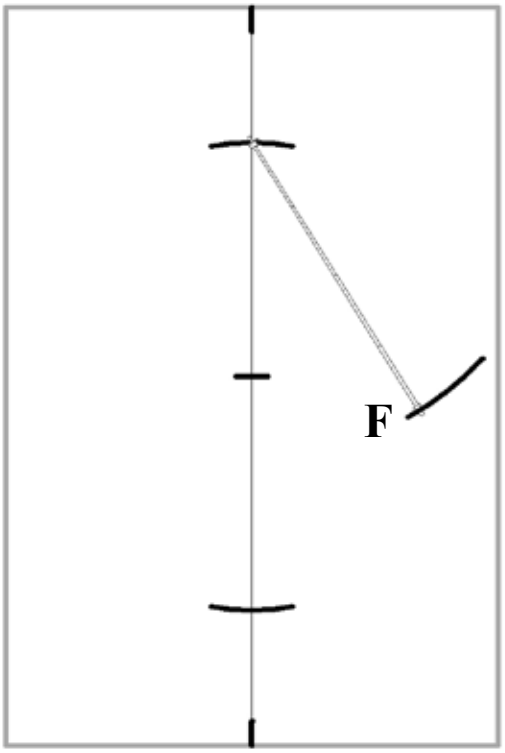
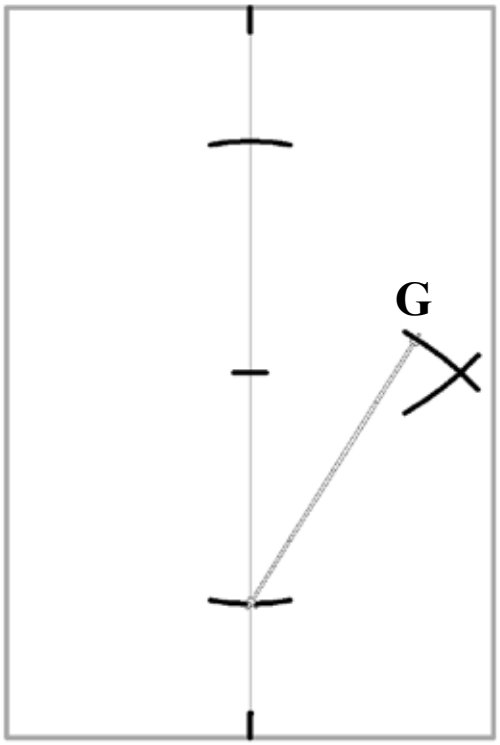


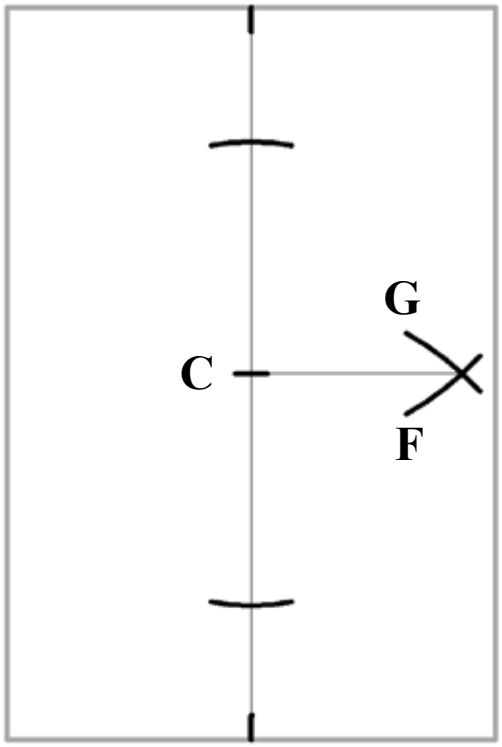
3) Use connecting tubes with trammel points and soapstone to place marks at points D and E on the chalk line.



4) Extend the trammel point, and create mark F from the top set of crosshairs. (The longer your trammel points, the more accurate the layout will be.)



5) Move the trammel points to the other set of crosshairs and create mark G to intersect with mark F.



6) Snap another chalk line from the center point of the slab (point C) to the intersection of G and F. This forms a perfect 90 degree angle.

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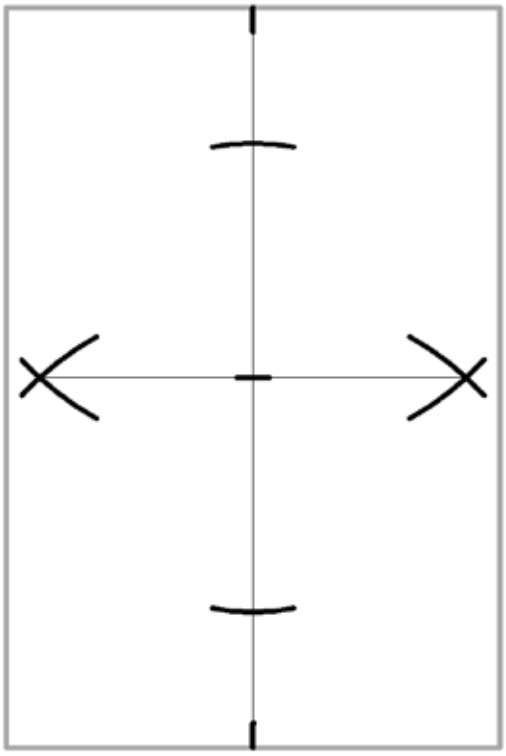
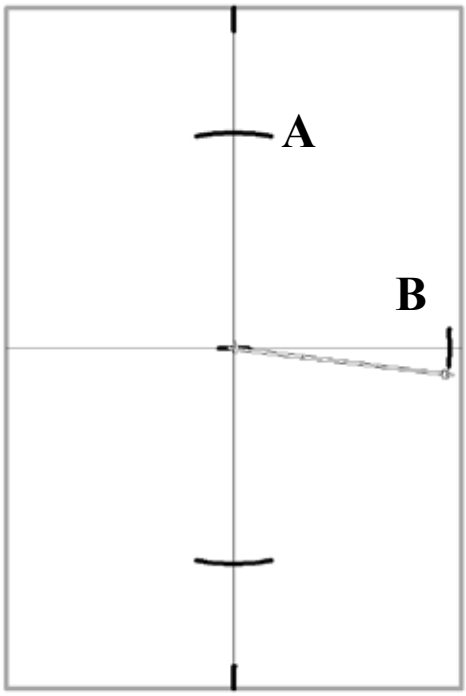


7) Repeat steps #4 through #6 on the other side of the slab.

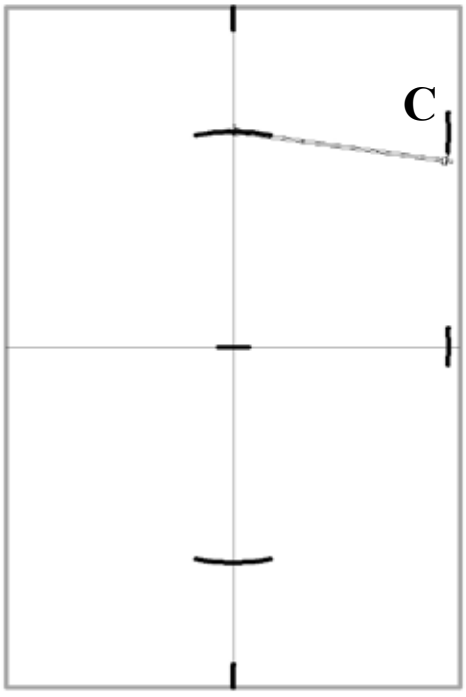
We suggest you practice your chosen layouts using a compass and paper prior to laying them out on concrete. Doing so will increase you confidence level while making you aware of tricky design elements and how to avoid mistakes.

Also be aware that arcs cannot be engraved next to a wall. Space your design accordingly or add a border to allow room for engraving.

FINDING 45 DEGREES



8) Using your square lines, set your trammel points on the center of the slab and make marks A and B as shown above.



9) Move the trammel points and make mark C as shown.

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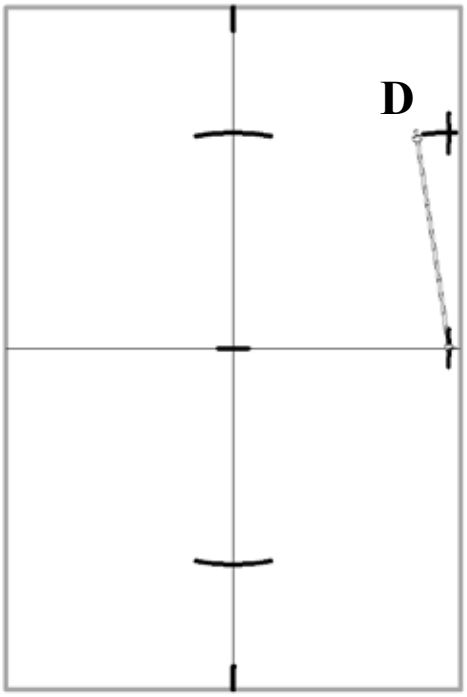
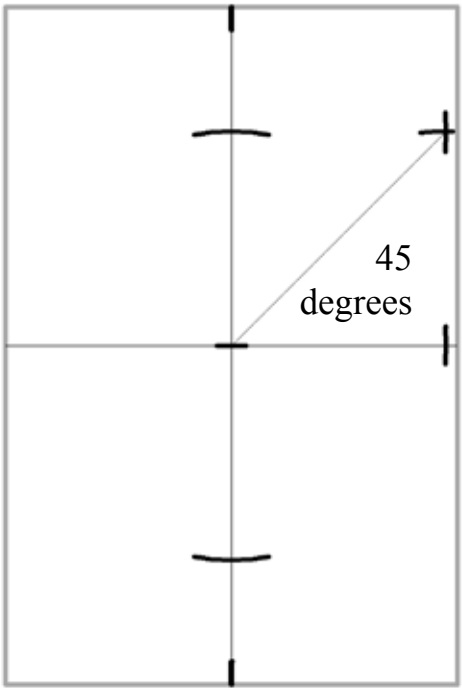
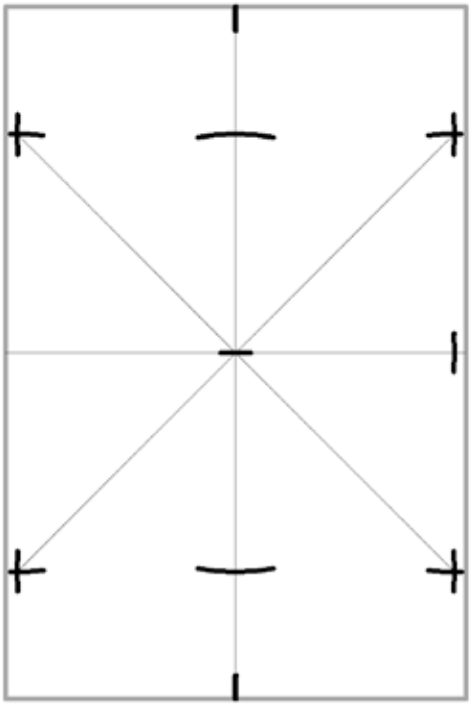


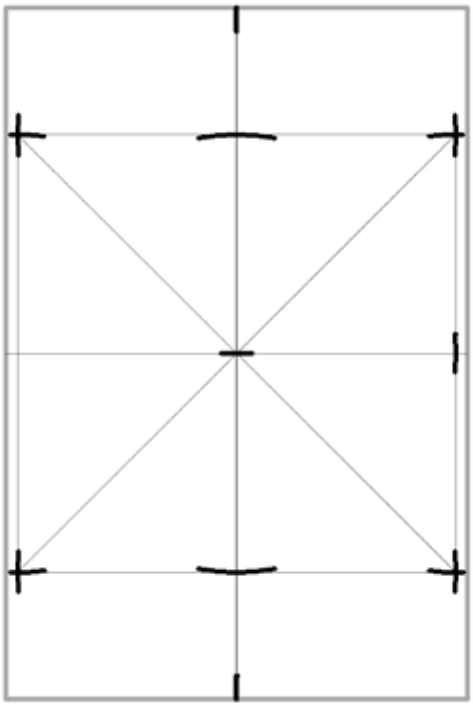
10) Place mark D to create a crosshair, as shown above.



11) Snap a chalk line from the center of the slab to the crosshairs you just made.



12) Repeat to create 45 degree lines on the 3 other corners of the slab.



13) These reference marks can be used to lay out a square.

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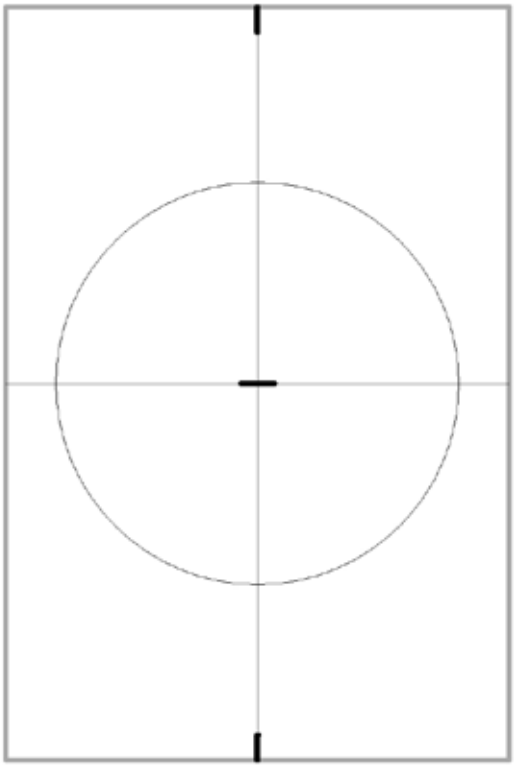
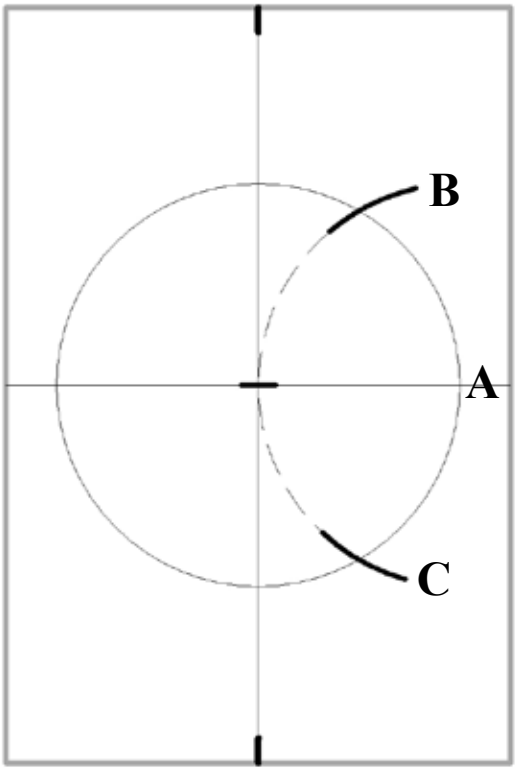
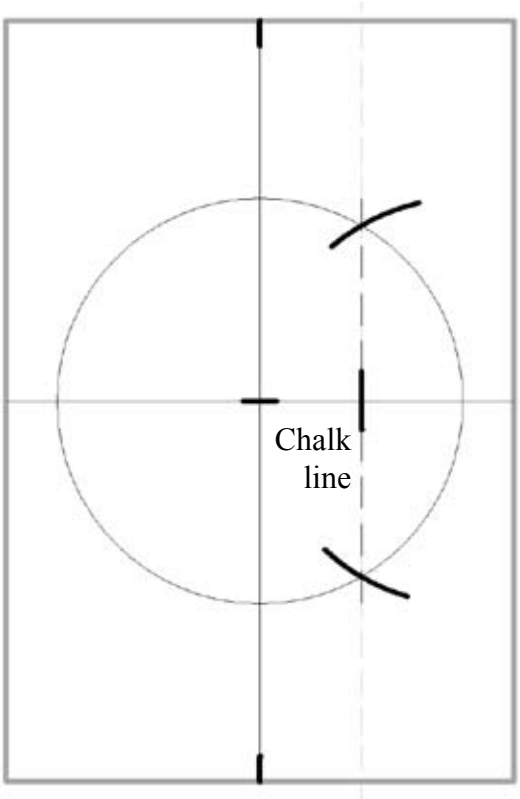
EASY PENTAGON



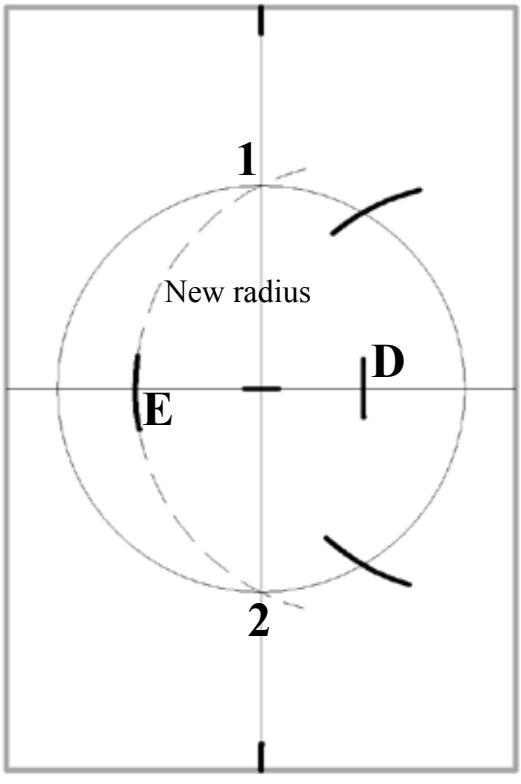
1) Start with the basic squared crosshairs. Use trammel points and soapstone to draw a circle from the center of the crosshairs.



2) Move the trammel points to the intersection at point A, and make arcs B and C to intersect the circle.



3) Snap a chalk line from the center of both intersections.



4) Place the trammel point on the new point (D), and adjust the **radius** to meet point 1 or point 2. Draw intersecting arc as shown to create point E.

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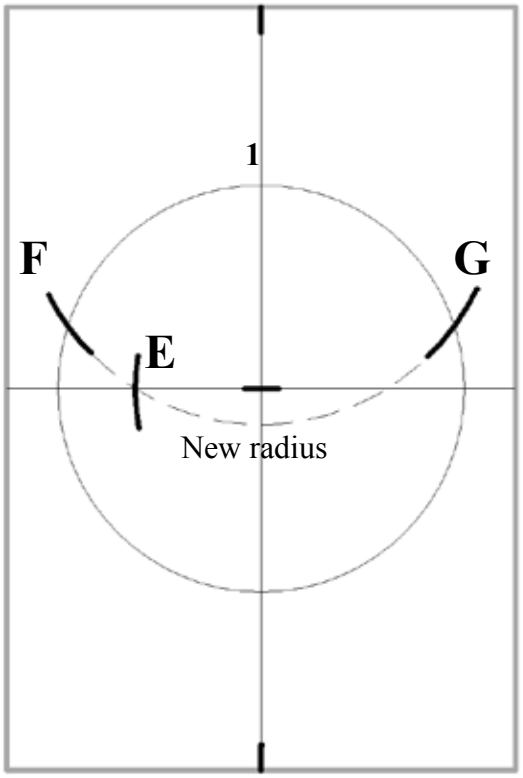
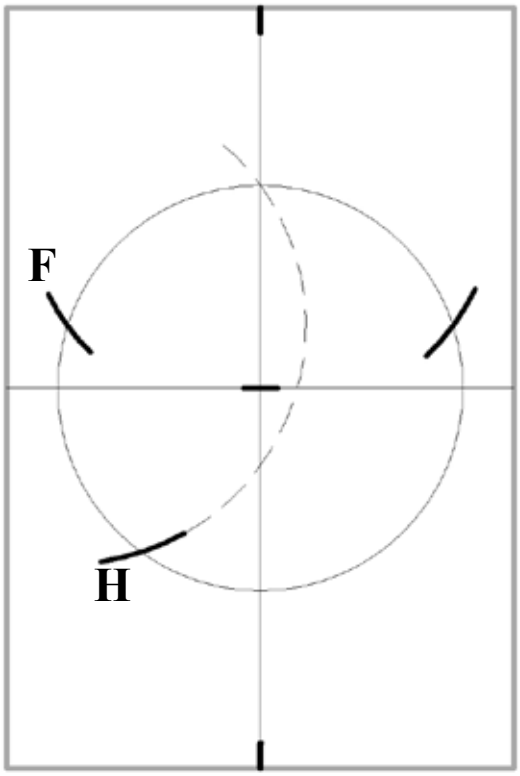
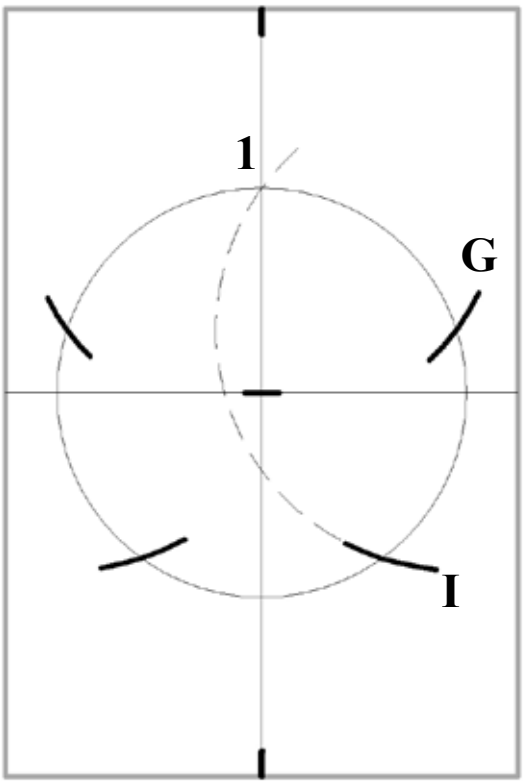


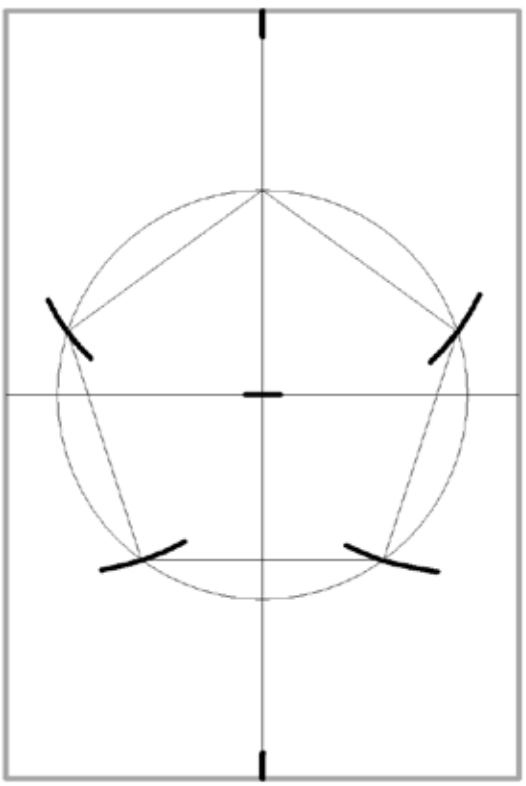
5) Move the trammel points to point 1, and adjust the **radius** to pass through point E. Draw 2 new crosshairs (points F and G), as shown above.



6) Move the trammel point to either of the new crosshairs (point F in this example), and draw point H.



7) Repeat from the other side of the circle (point G) to create point I.



8) Connect all lines that intersect the original circle. The pentagon is complete.

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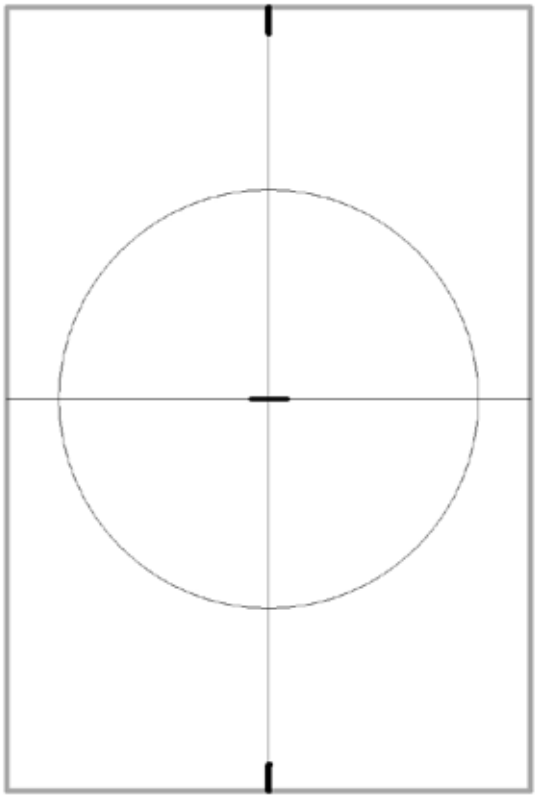
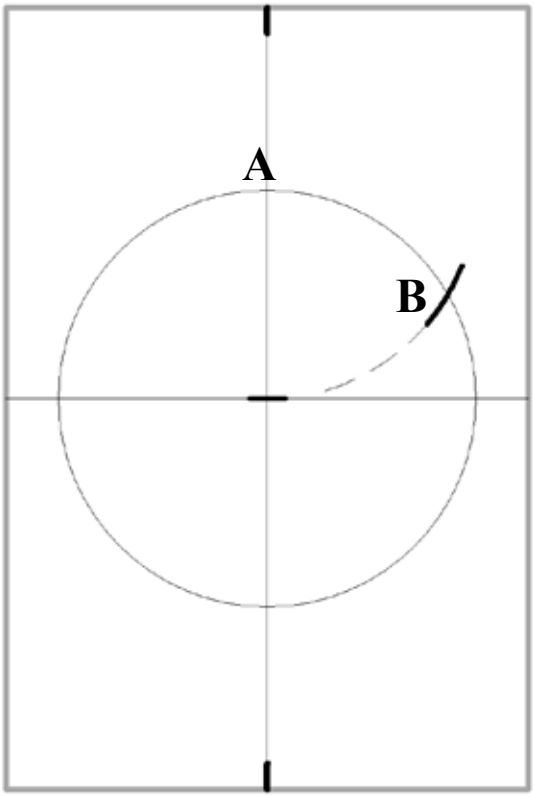
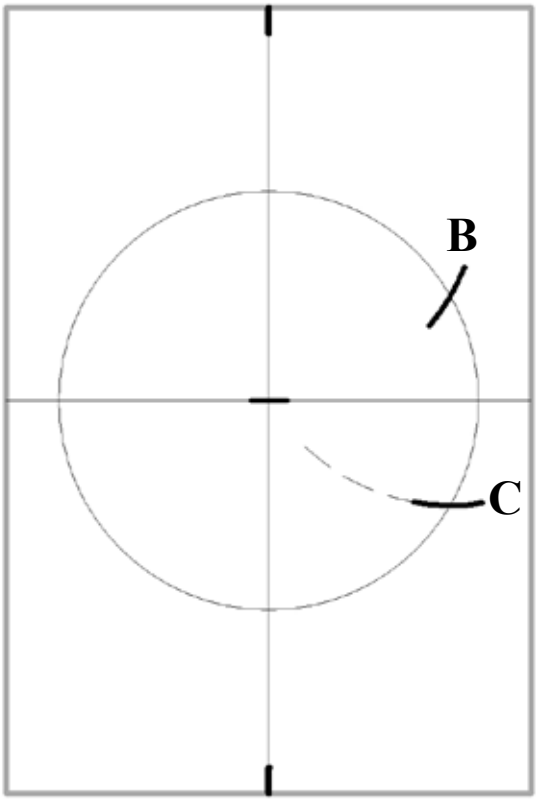
EASY HEXAGON



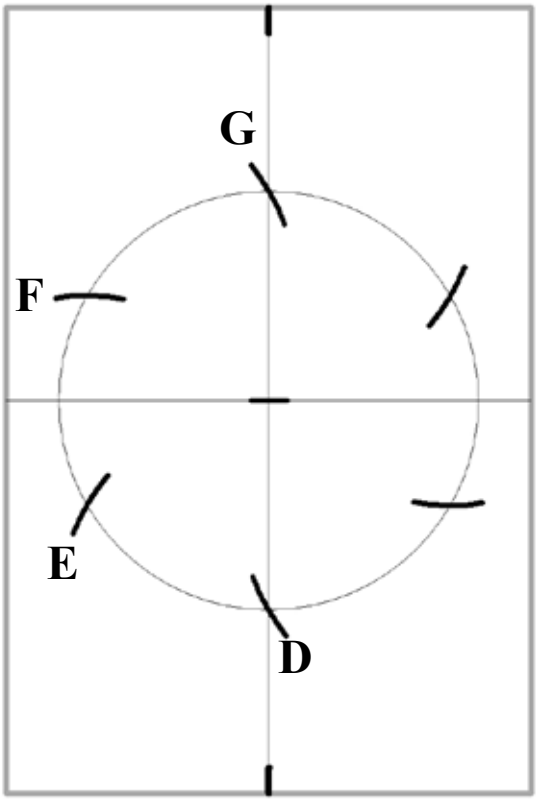
1) Start with the basic squared crosshairs. Use trammel points to draw a circle from the center of the crosshairs.



2) Without adjusting the trammel point **radius**, move it to point A and draw an arc that intersects the circle (point B).



3) Move the pivot to point B and repeat.



4) Repeat this process until you have 6 points on the circle's circumference.

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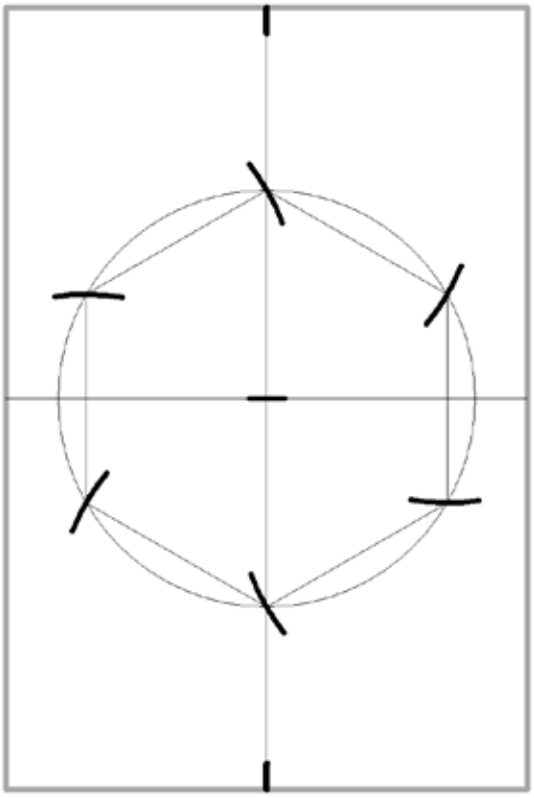
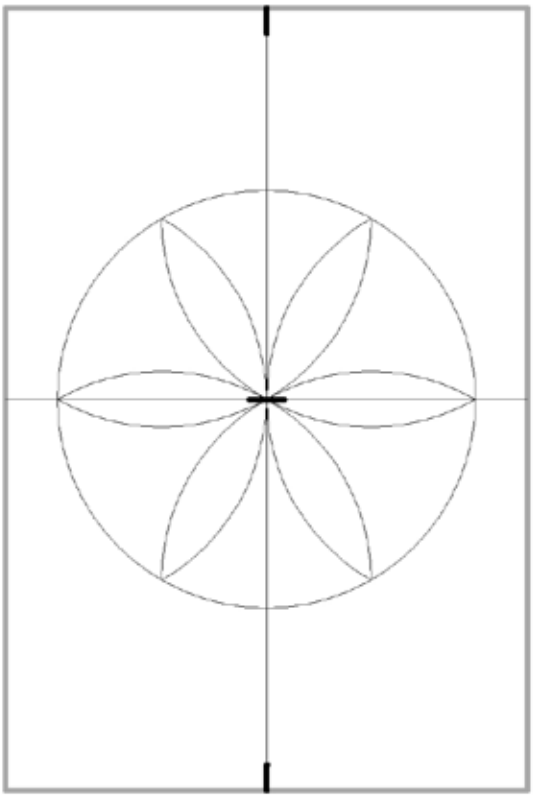
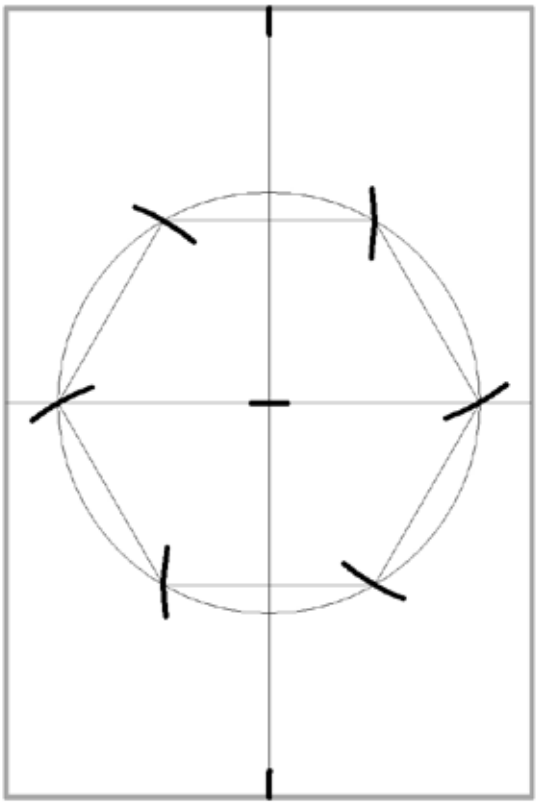


5) Snap chalk lines between each of the new points, as shown. The hexagon is complete.



6) By simply extending each arc between the outsides and center of the circle--and then repeating the process in the opposite direction--you can create a simple flower pattern.



7) The orientation of the hexagon can be changed by starting the above steps on any position around the circle.

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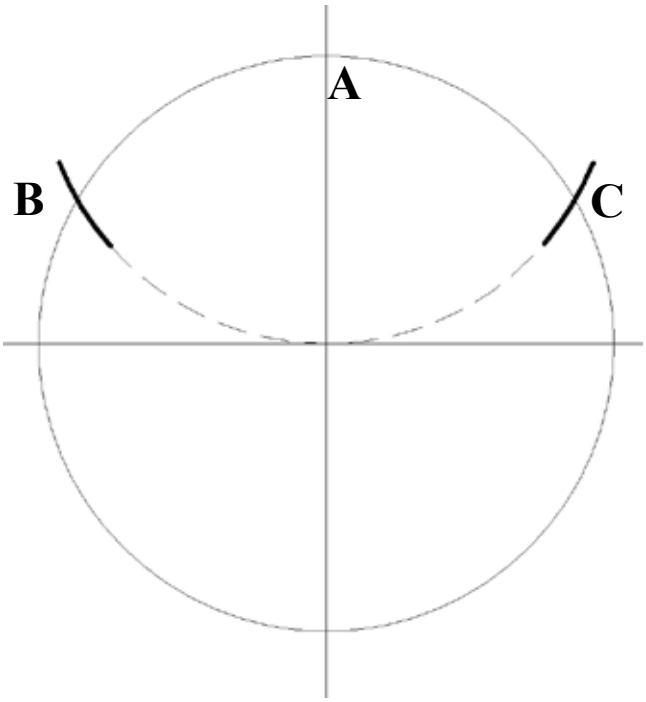
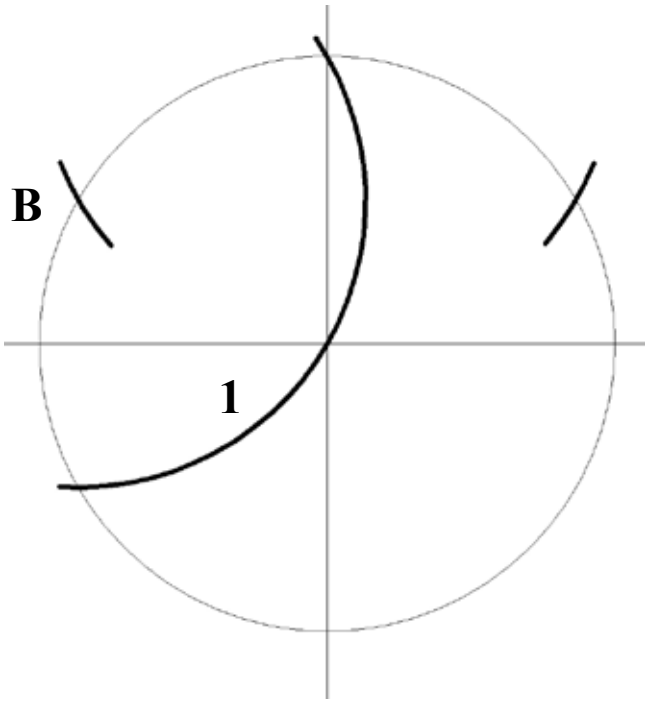
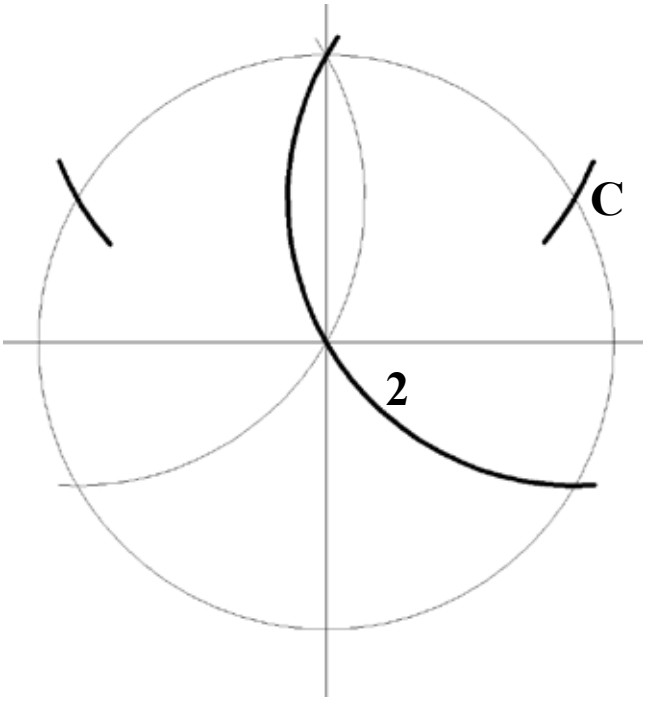
CELTIC KNOT (or "TRIQUETRA")



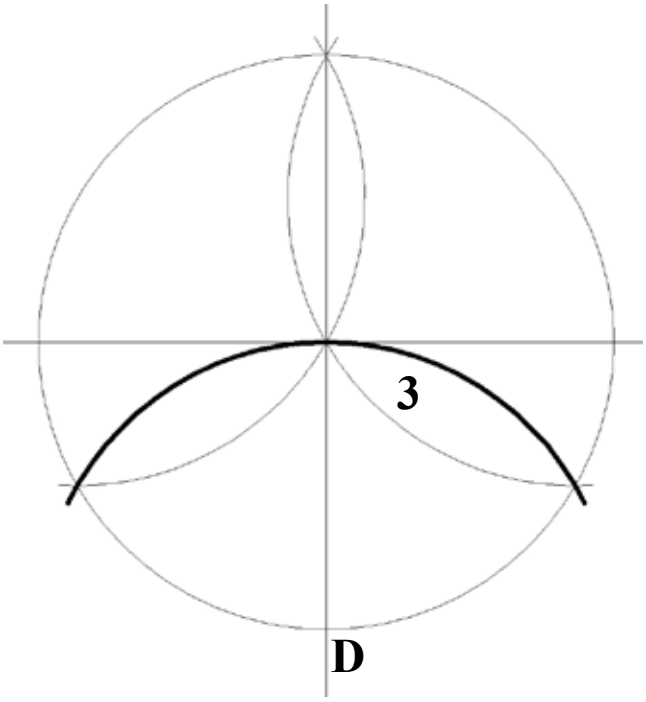
1) Start with a circle. Without changing the **radius** of your trammel points, move to point A and create intersecting arcs at points B and C.



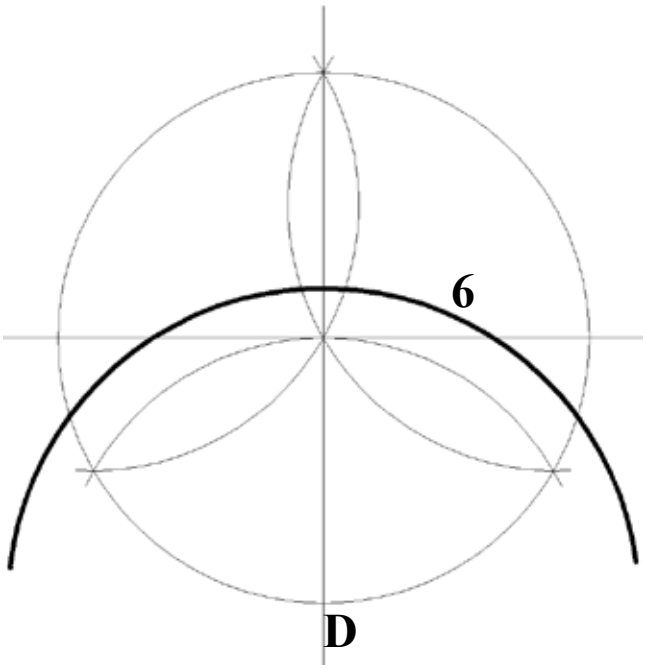
2) Using the same **radius**, draw a full arc (1) from point B to intersect the circle in 2 places, as shown above.



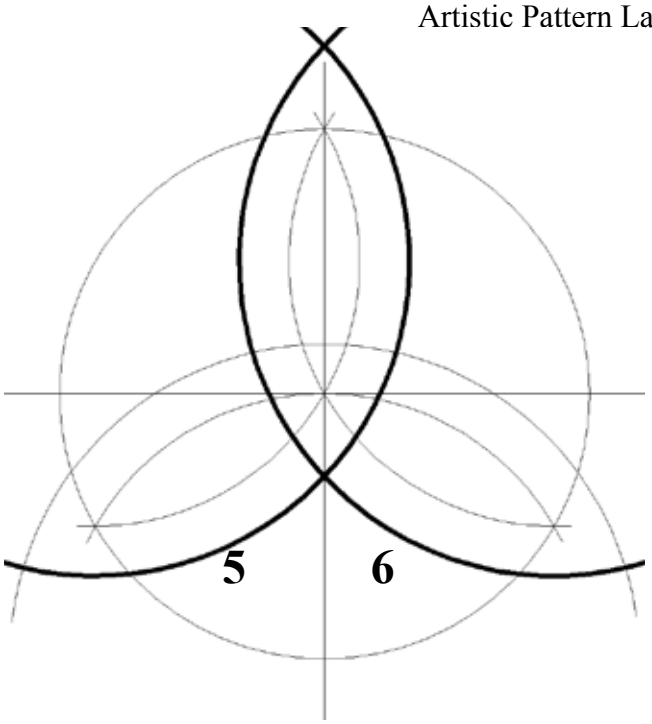
3) Repeat from point C to create arc 2.



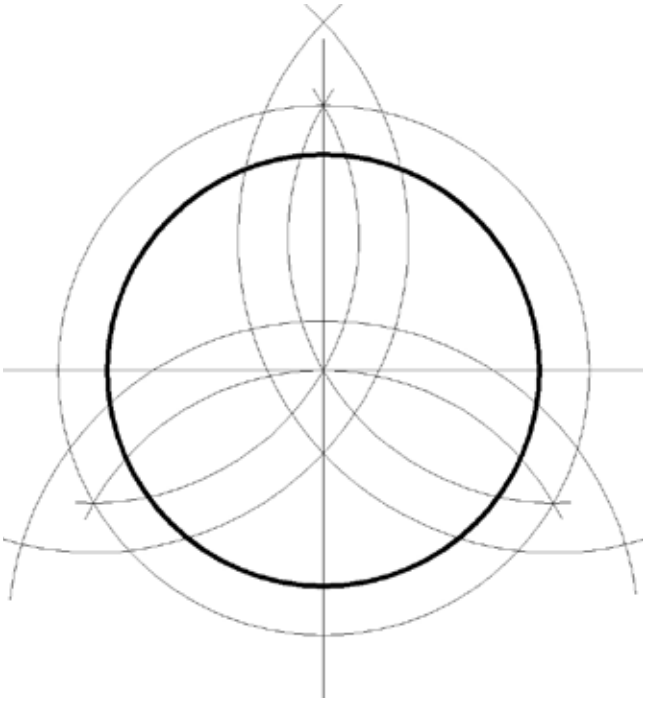
4) Repeat from point D to create arc 3.



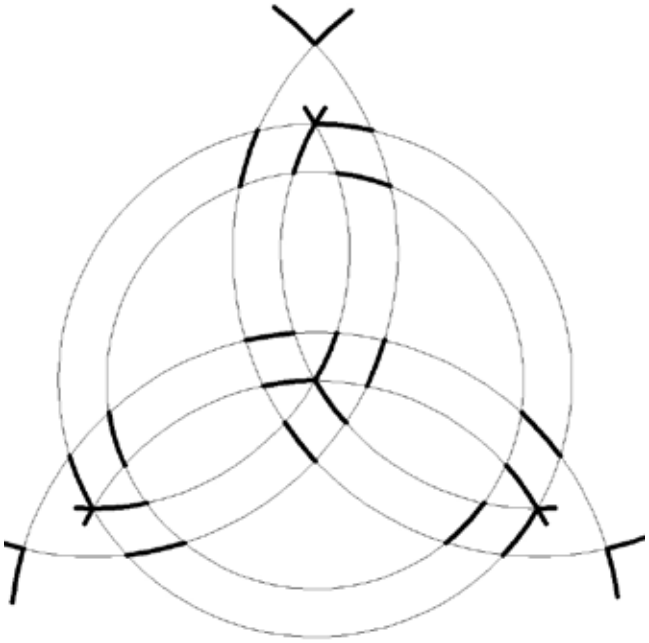
5) While at point D, adjust the trammel points to a larger **radius**. This radius can be any size, depending on personal preference and the size of the pattern. Draw concentric arc 6 as shown above.



6) Repeat for arcs 1 and 2 to create concentric arcs 5 and 6. Make sure to extend the arcs so they meet at the outer edges.



7) At the center-point, draw another circle inside of the primary circle. Ideally, the offset between these 2 circles should be equal to the offset used between the concentric arcs.



8) Erase the line segments shown above. These lines will not be cut, and should represent a consistent pattern throughout the design.

When cutting patterns such as this, it is helpful to place an object (brick, etc.) in areas of the pattern where you intend to stop cutting.

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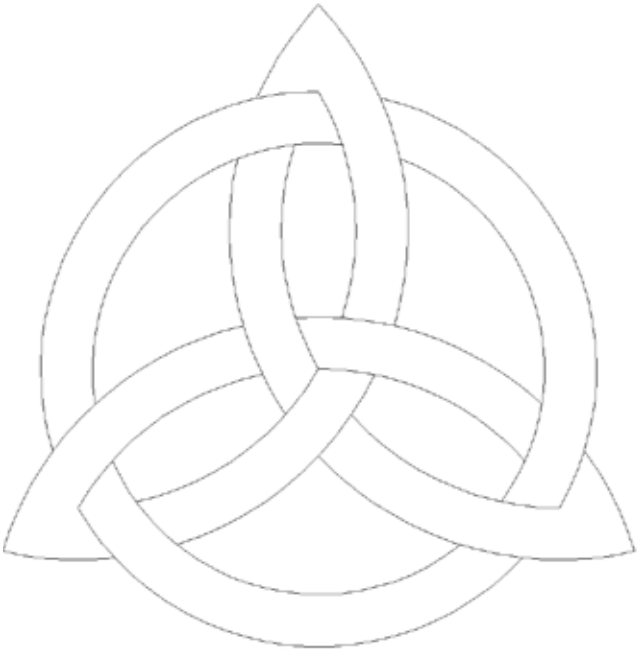

9) The completed Triquetra. Note how the pattern consistently laps ‘over, under, over, under’.

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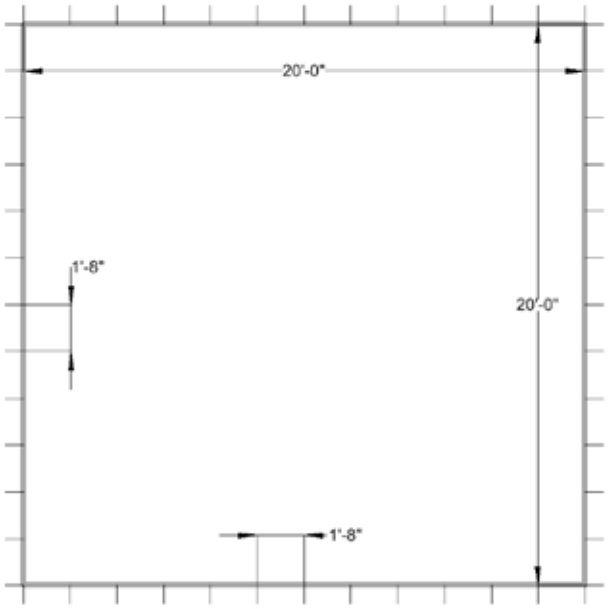
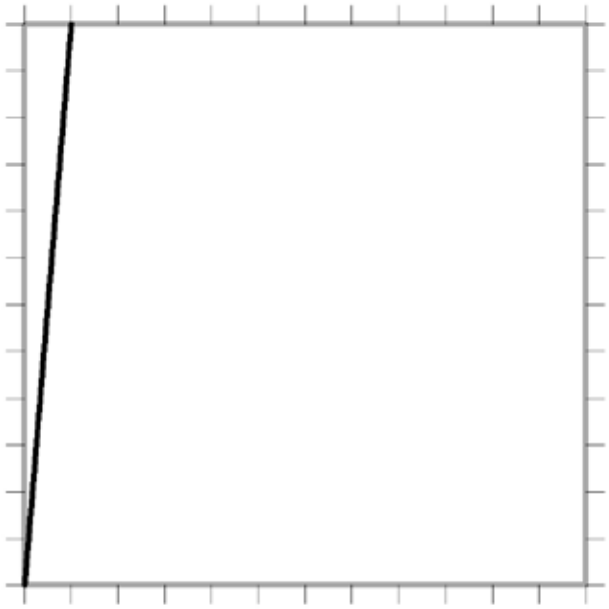
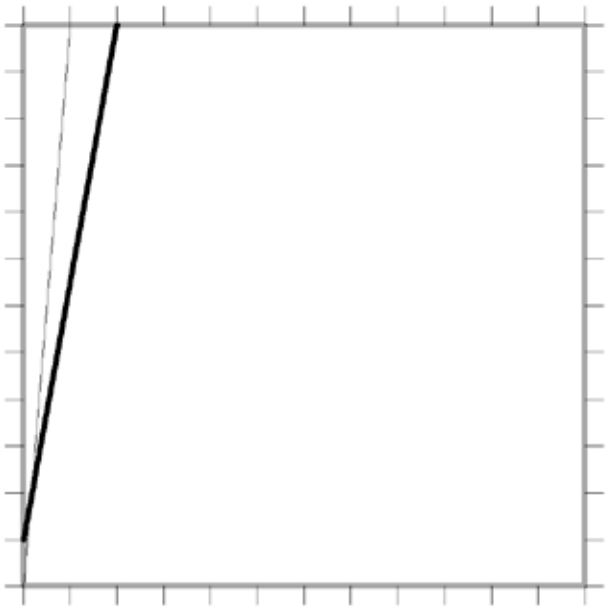
LINE-BASED PATTERNS



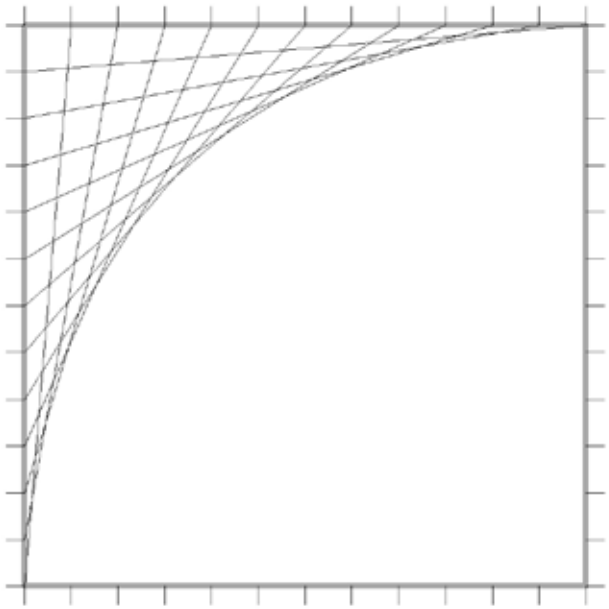
1) Divide the slab into an equal number of sections, as shown above. This example shows a 20' x 20' slab divided into twelve (12) 20" sections. Larger slabs may need to be divided into more sections (and smaller slabs into fewer sections) to maintain the proper proportions of the pattern.



2) Start at any corner and snap a line to the mark 1 space over from the opposite corner.



3) Move 1 space over from the corner you started at, and snap a line from that mark to the next mark on the perpendicular side.



4) Continue to snap lines between the marks on 2 perpendicular sides.

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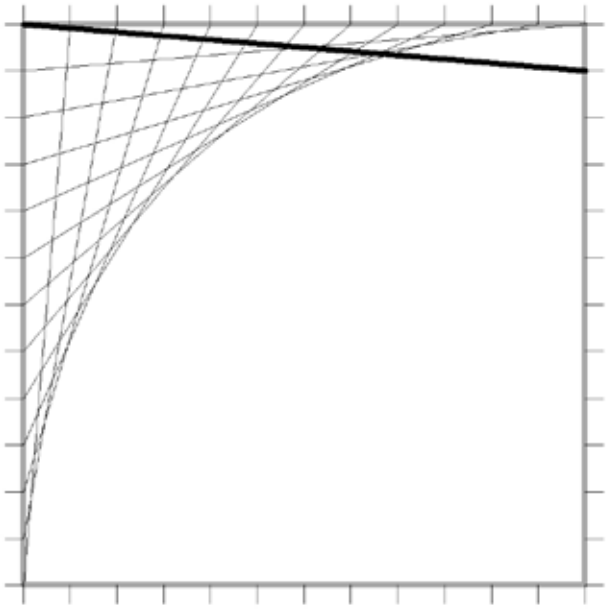
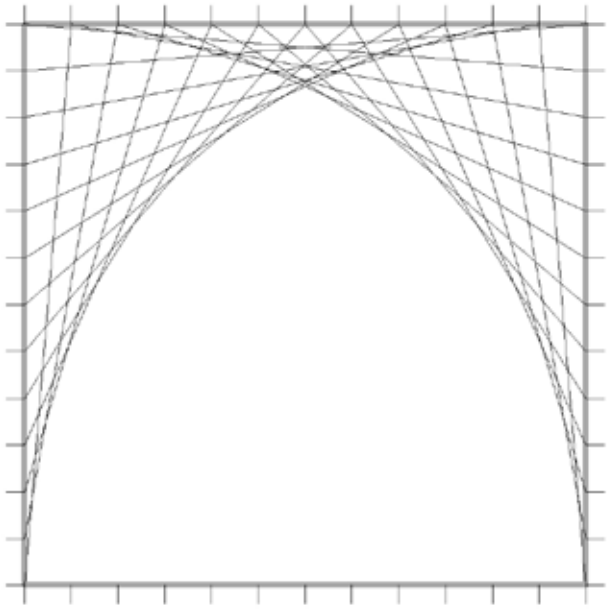
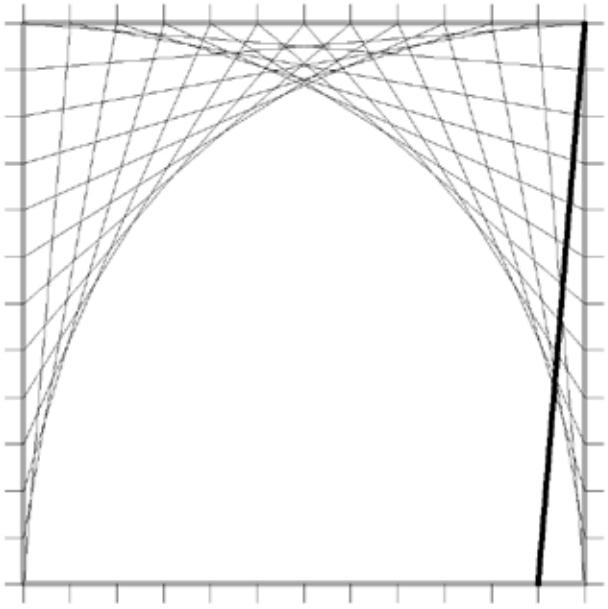


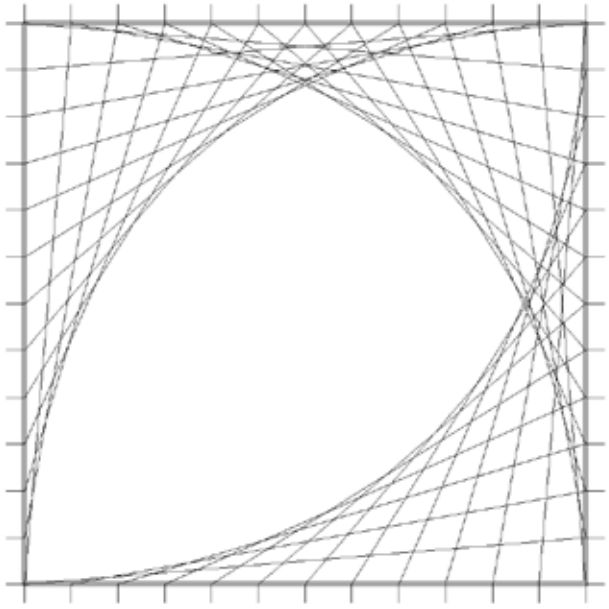
5) Continue working around the square.



6) The 2nd set of lines completed.



7) Continue working on around the corner.



8) The 3rd set of lines completed.

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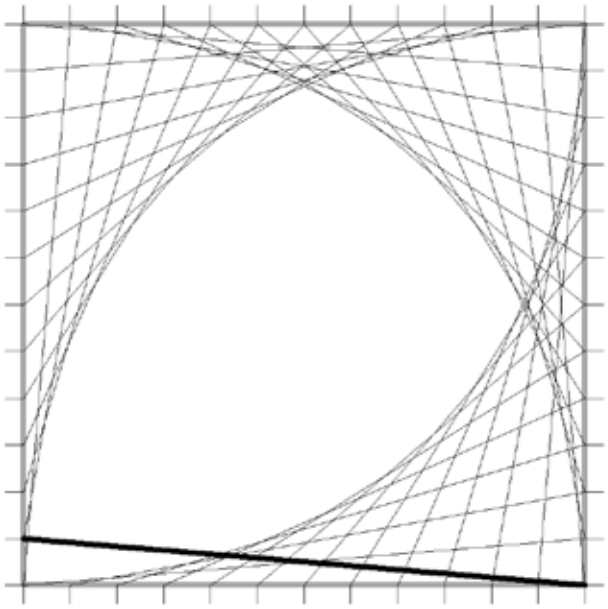
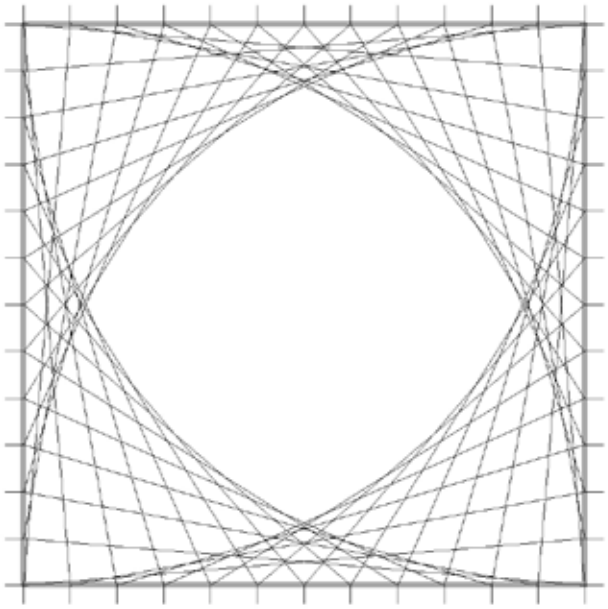
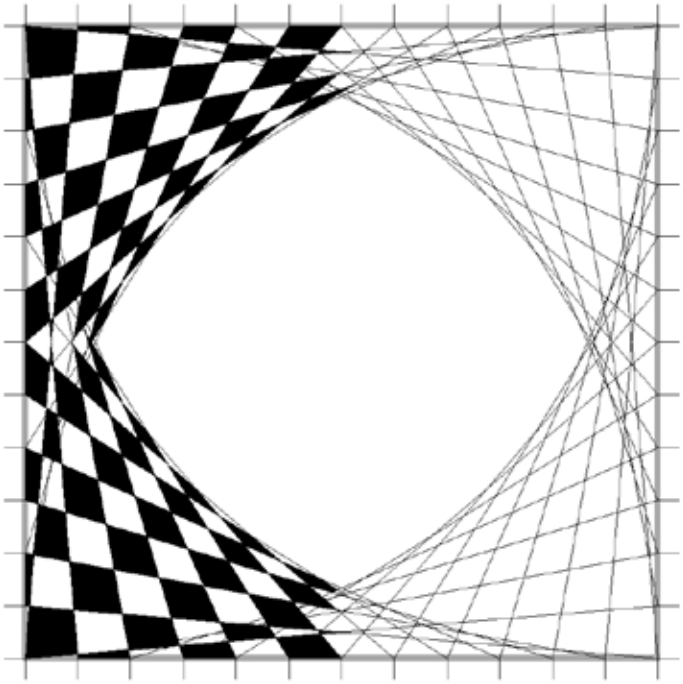


9) Continue on the last side of the square.



10) All lines completed.



11) The completed pattern, with only one side filled in (for clarity). Note that the filled-in areas do not necessarily include all of the line segments (especially the very small segments).

Prior to cutting this pattern, it is recommended that you study the pattern carefully and erase any lines that do not need to be cut.

Attention to detail is paramount when producing a pattern such as this.

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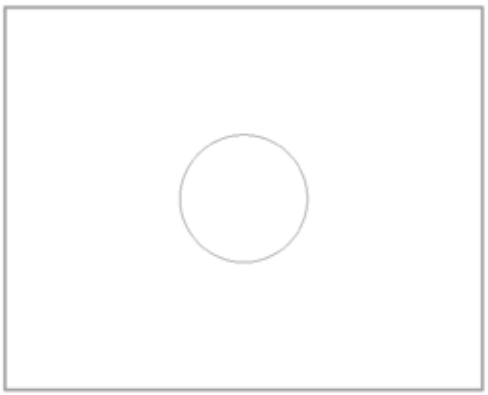
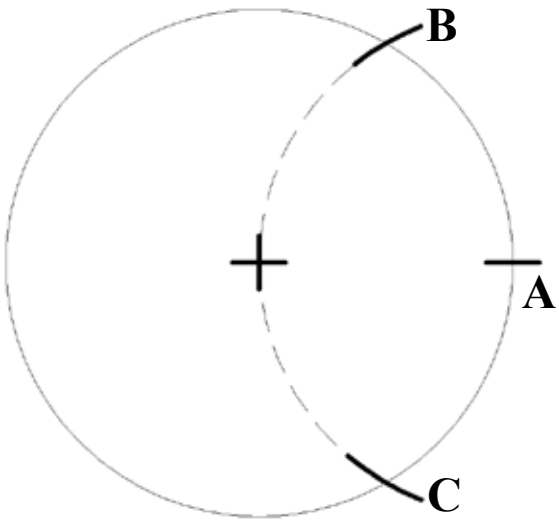
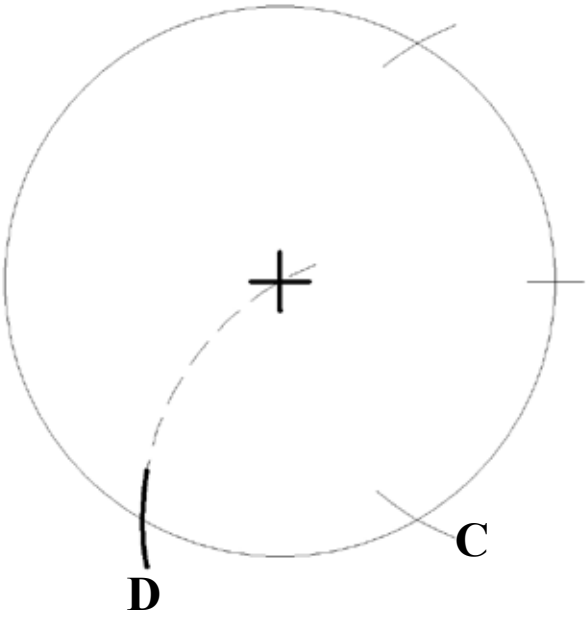
LINE PATTERN 2



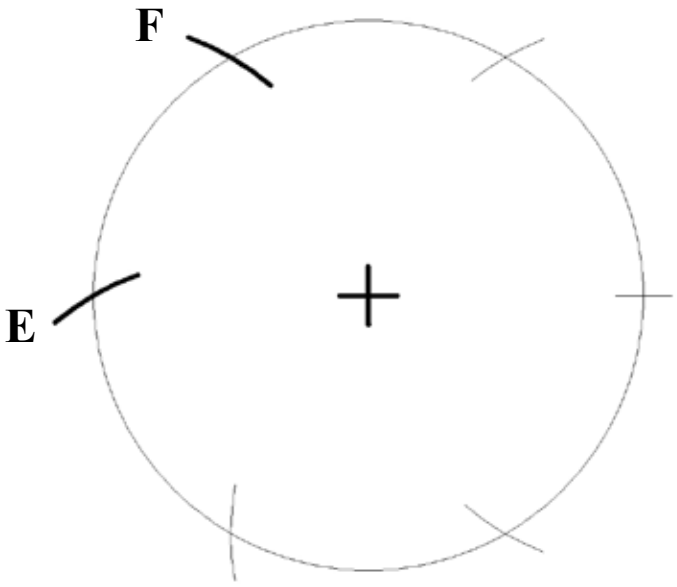
1) In this example, the slab is 12’ wide and 15’ long. Start by drawing a 4’ **diameter** (2’ **radius**) circle in the center of the slab.



2) Using the same 2’ **radius** set on the trammel points, place the pivot point anywhere on the circle’s circumference (point A in this example) and create points B and C.



3) Move the pivot to point C, and create point D.



4) Continue moving the trammel points around the circle until you have 6 intersection points.

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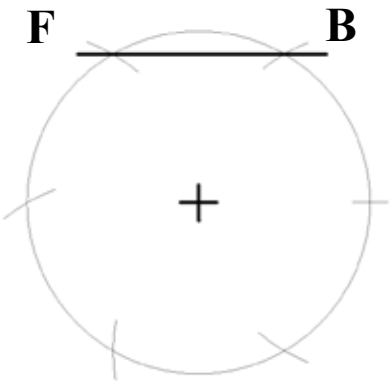
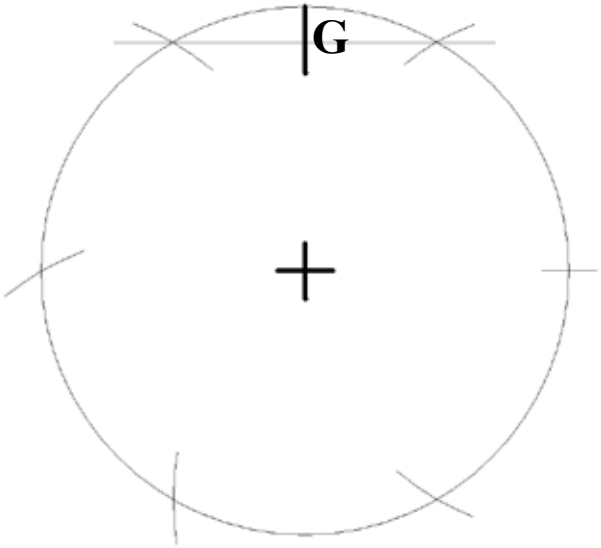
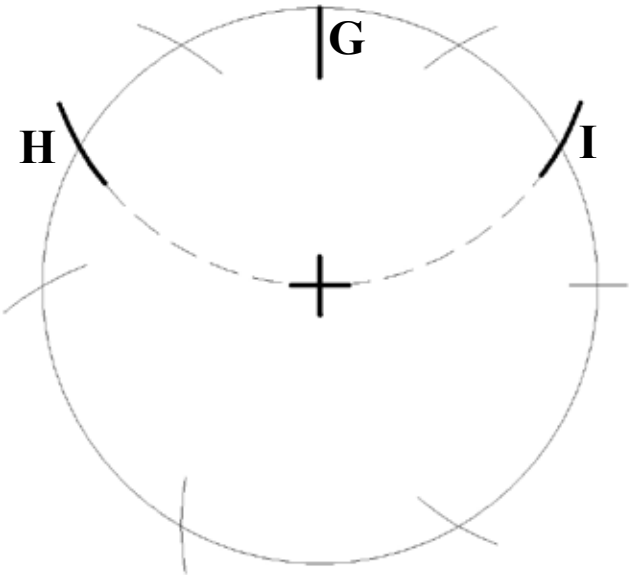


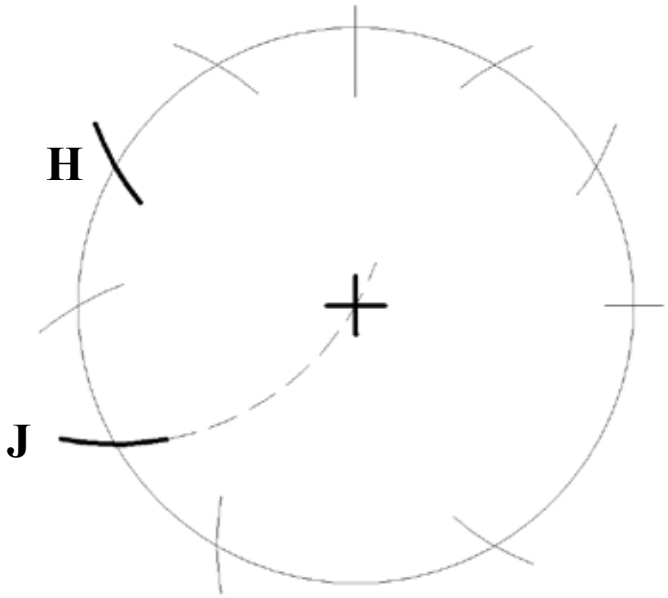
5) Snap a chalk line between any 2 neighboring points on the circle (points F and B in this example).



6) Measure the distance between these 2 crosshairs, and create point G on center of the chalk line. Snap a line from the center of the circle through point G to intersect the circle.



7) Using the same 2' radius with the trammel points, place the pivot point on point G and create points H and I. This process simply rotates the same 6-division pattern by 30 degrees to create 12 points on the circle's circumference.



8) Move the pivot to point H and create point J.

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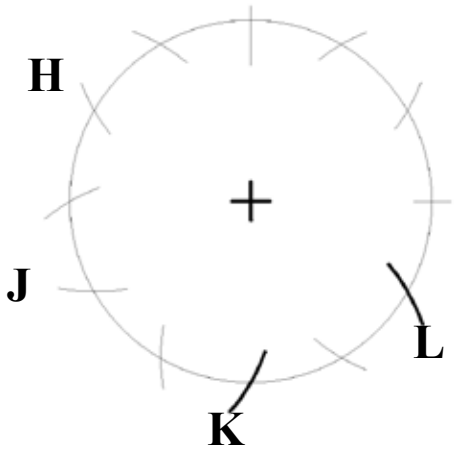
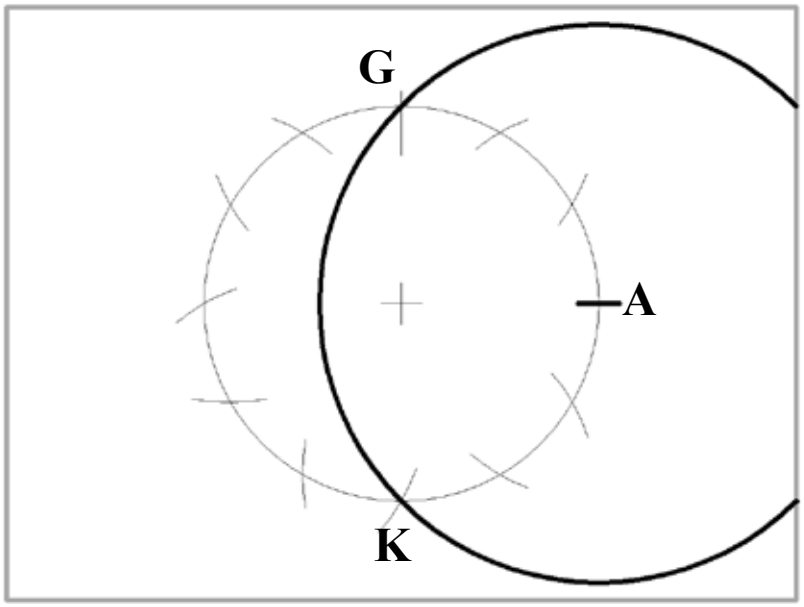
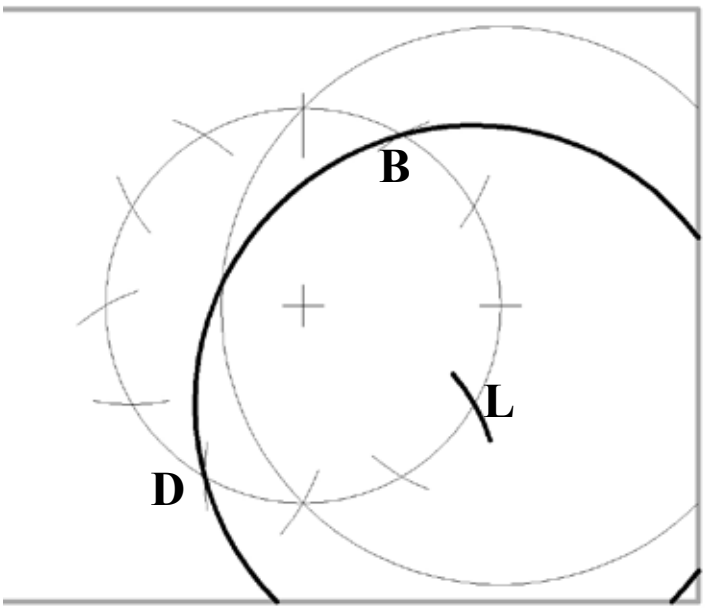


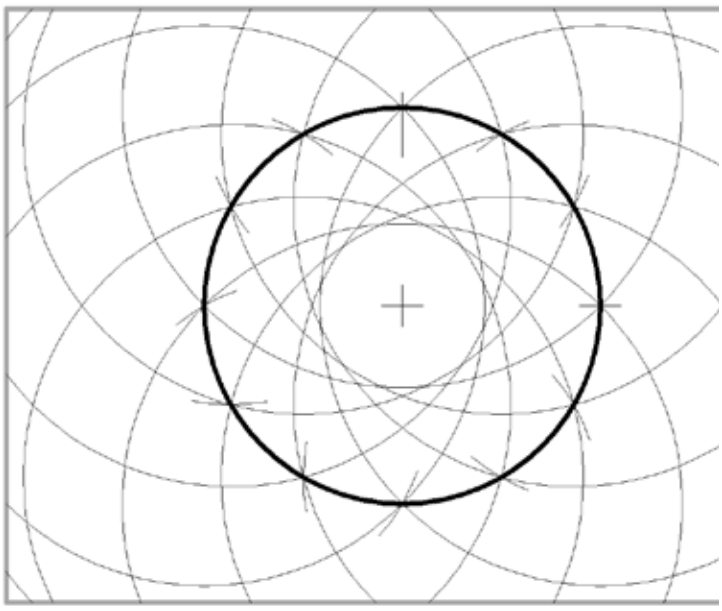
9) Continue moving the trammel points around the circle until you have 6 more intersection points, creating a total of 12 points.



10) Place the pivot on any of the 12 points (point A in this example), and adjust the trammel points to span past the center of the original circle and pass through another set of points (points G and K in this example), as shown. Draw a full arc that goes to the edges of the slab.



11) Move the pivot point to the next point (point L in this example) and draw another full arc. (Note the small arc section in the lower right-hand corner of the image above.)



12) Continue moving the trammel point pivot to all 12 points around the circle until you have drawn 12 full arcs that create a very interesting pattern.

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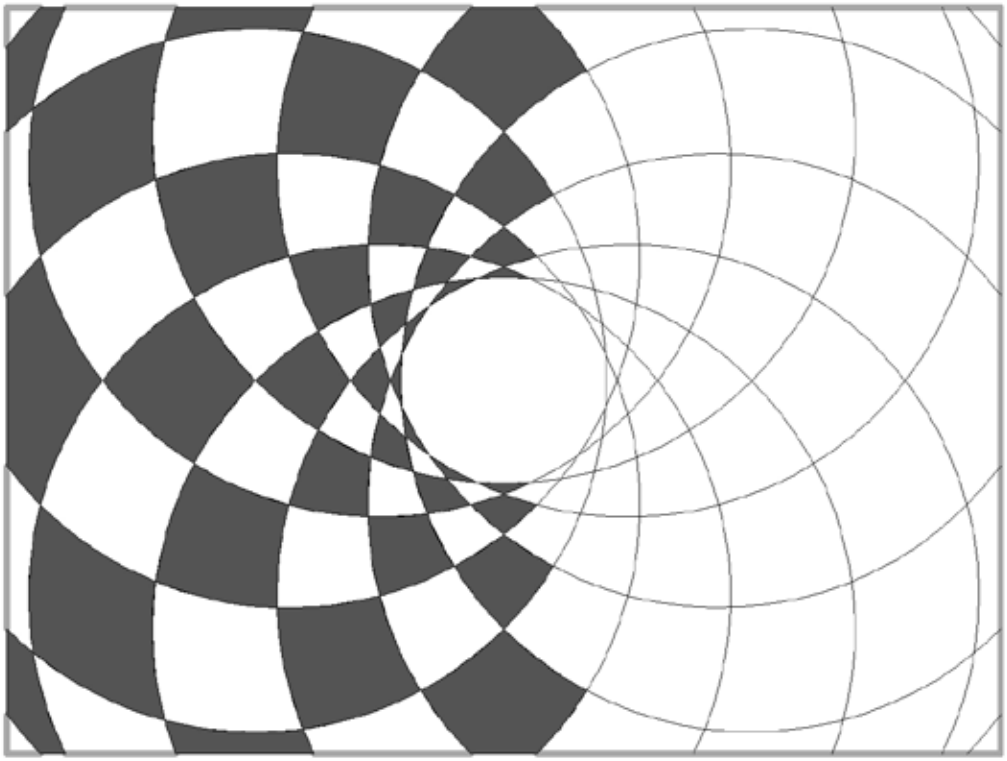

13) The completed pattern shown with the intersection points (Step 9) erased. Only one side is shaded, for clarity and sake of comparison.

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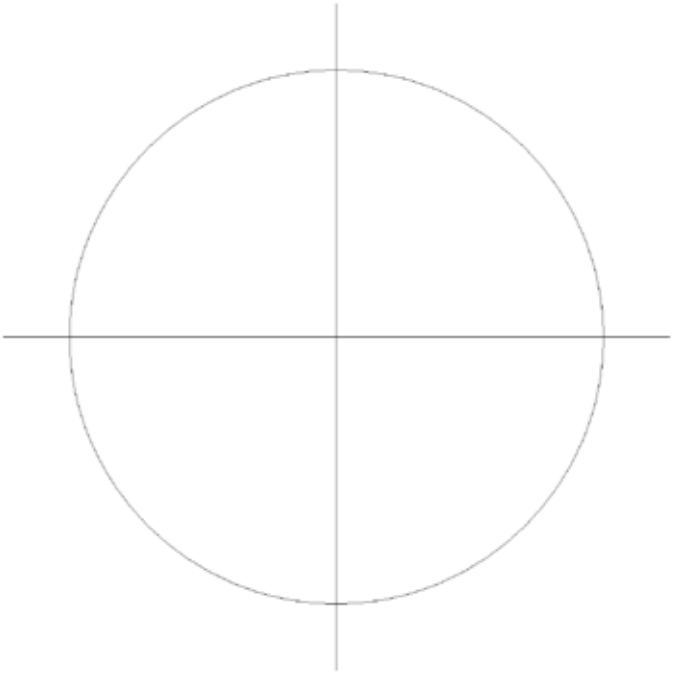
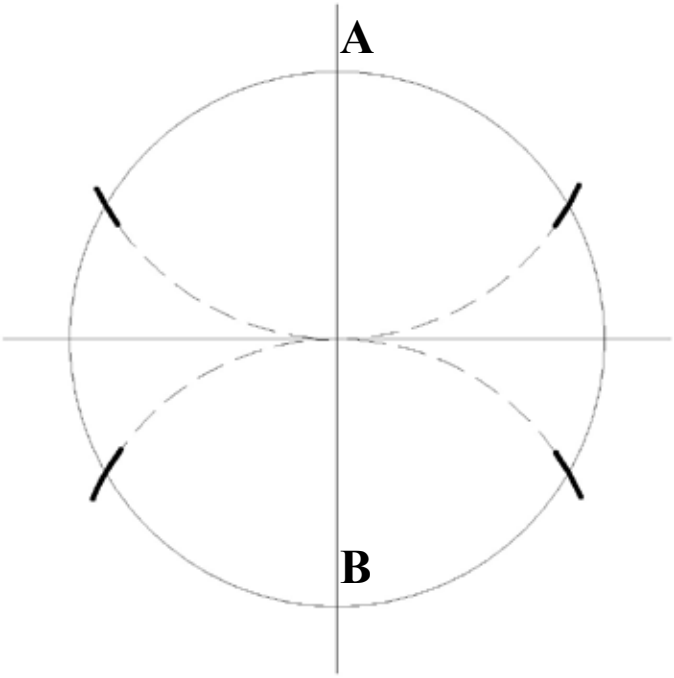
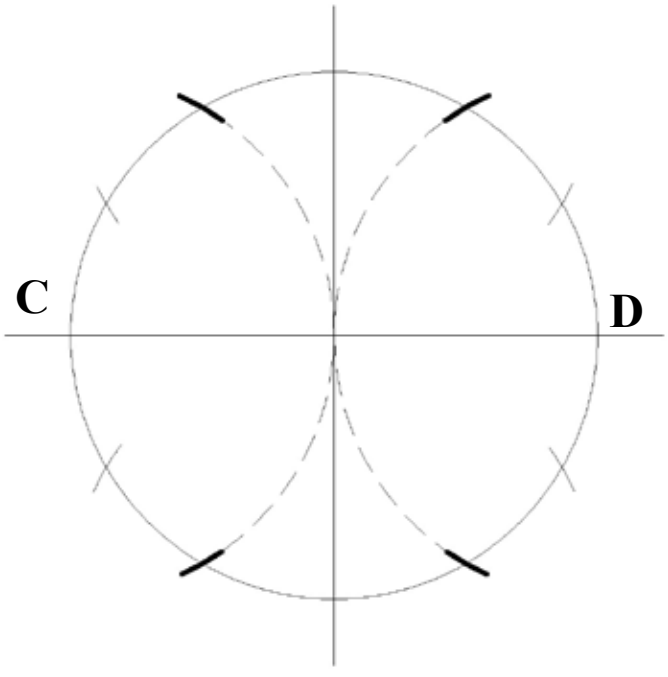
LINE PATTERN 3



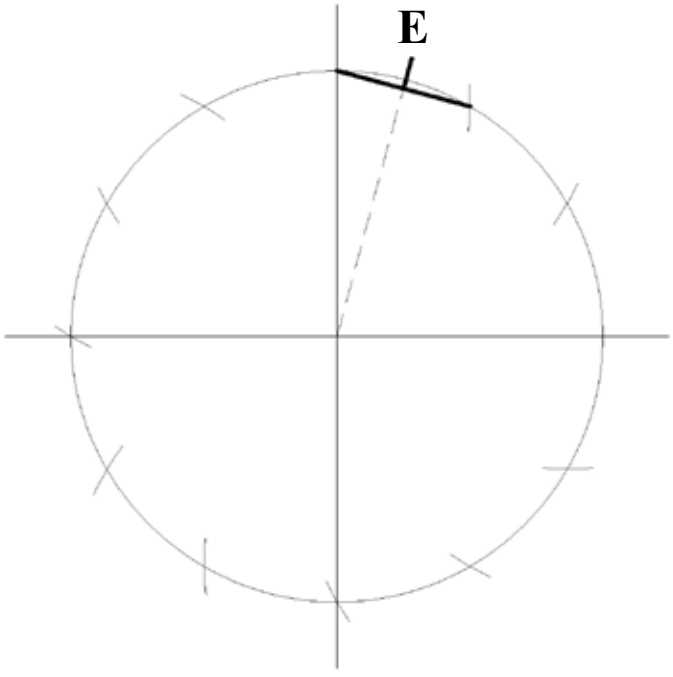
1) Begin with the basic crosshairs, and draw a circle that almost completely fills the slab.



2) Using the same **radius** on the trammel points, start at the top intersection (A) and draw 2 intersecting marks, as shown. Repeat from intersection B. This divides the circle into 6 sections.



3) Using the same **radius** on the trammel points, start at intersection C and draw 2 more intersecting marks. Repeat from intersection D. This divides the circle into 12 sections.



4) Draw a temporary line between any 2 intersections, measure that line and place a mark at the center-point. Snap a chalk line from the center of the circle, through the center point mark and on through the perimeter, forming Point E.

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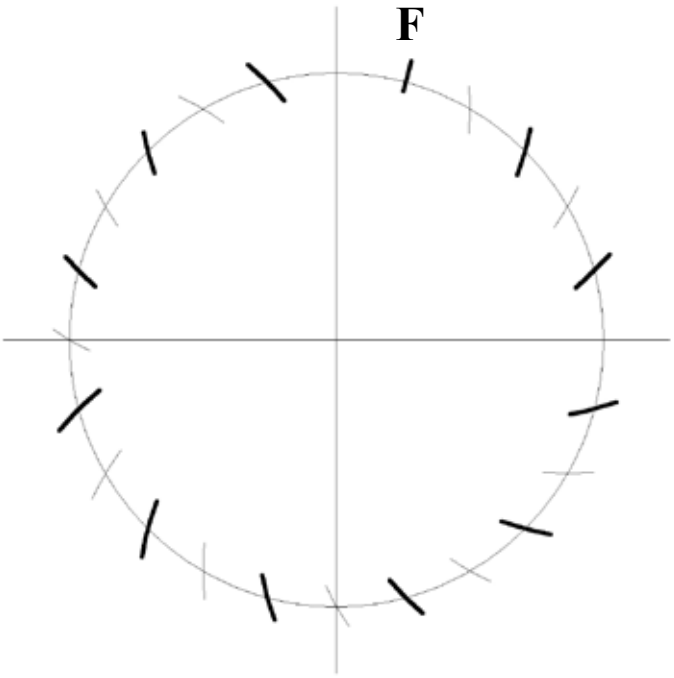
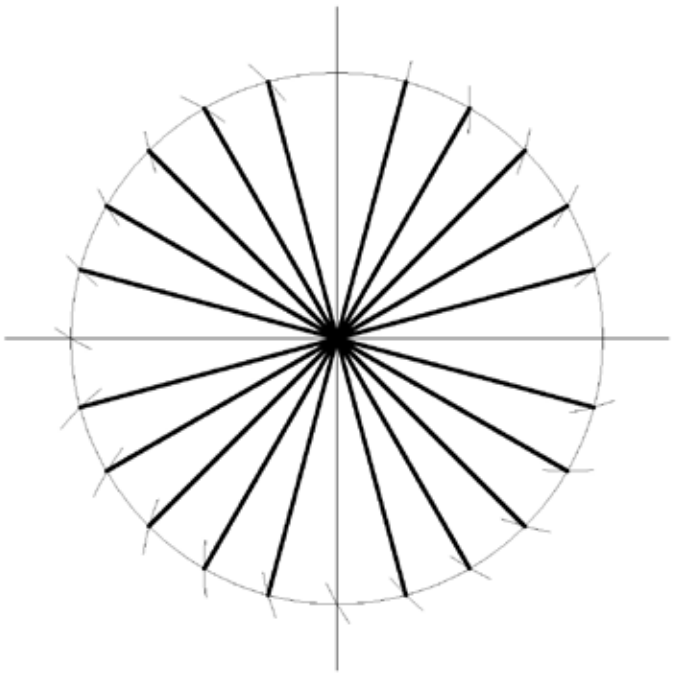
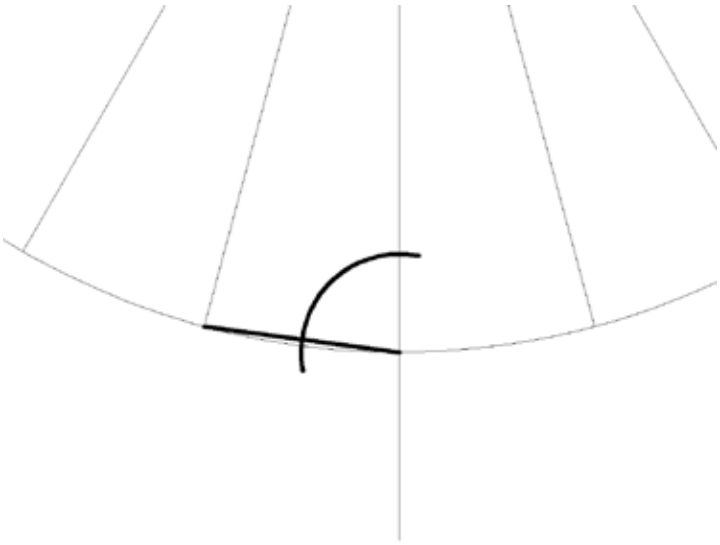
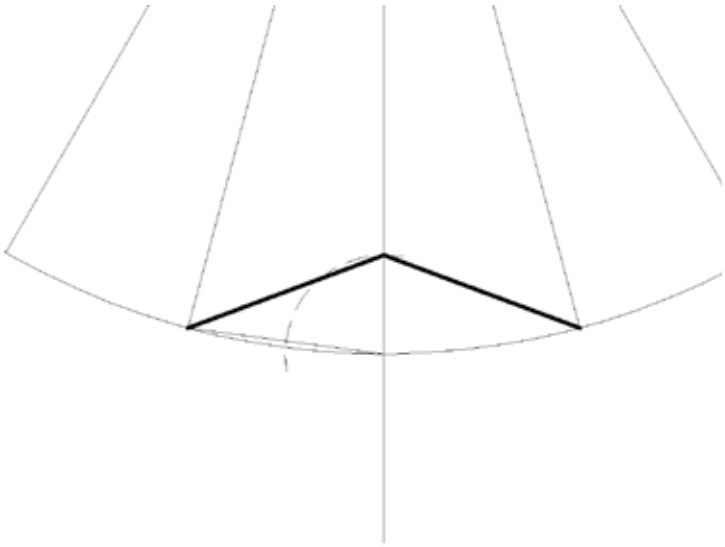


5) Using the same **radius** on the trammel points, start at the new intersection (F) and continue to make intersecting marks all the way around the perimeter of the circle. This divides the circle into 24 equal sections. To avoid confusion, erase the temporary line you made in step 4.



6) Snap 10 chalk lines from opposing points on the circle. (The basic crosshair lines serve as 2 of the 12 completed division lines.) Each line should pass through the center point of the crosshairs/circle. (Line AB is not shown here.)





7) The exact proportions of the 'diamond' shapes is up to personal preference. However, the above method gives a nice appearance. Draw a line from the endpoints of 2 adjacent chalk lines. Adjust the trammel points to meet the center of that line, and draw an arc that intersects one of the chalk lines. Then, snap lines from the endpoints of the 2 chalk lines to the intersection point you just made.

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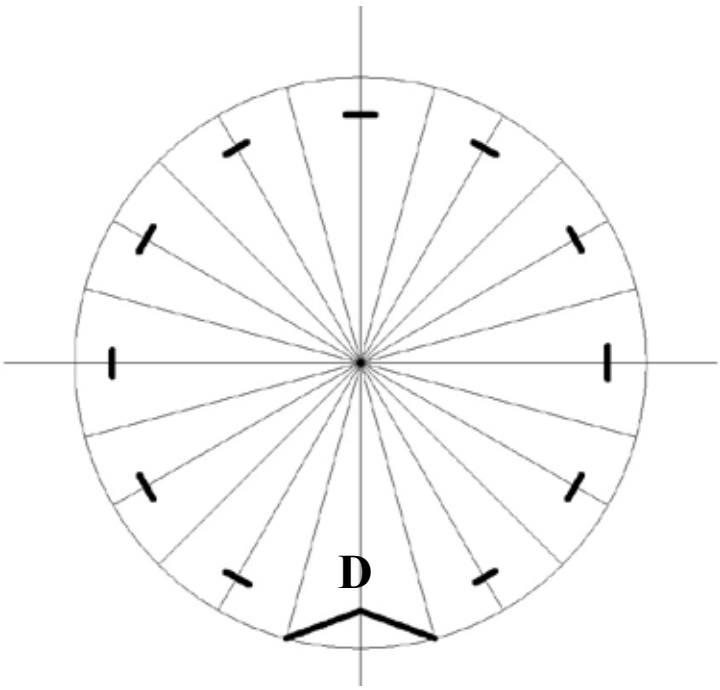
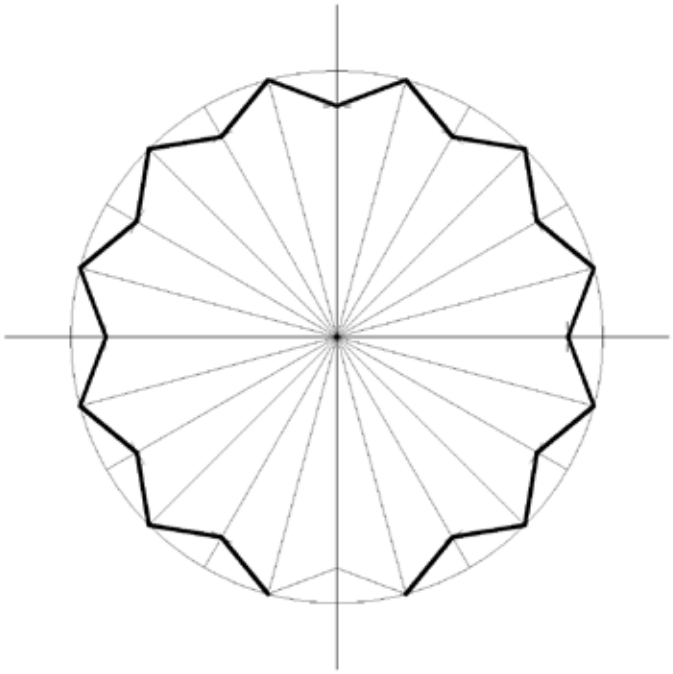
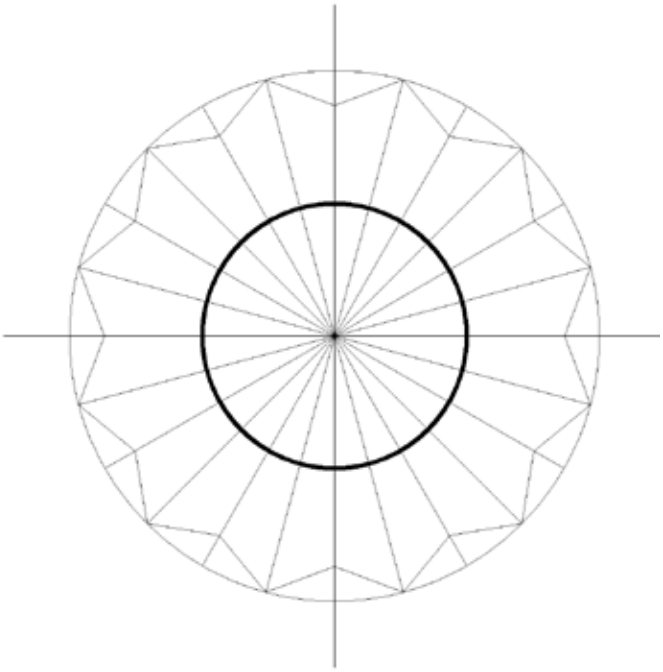


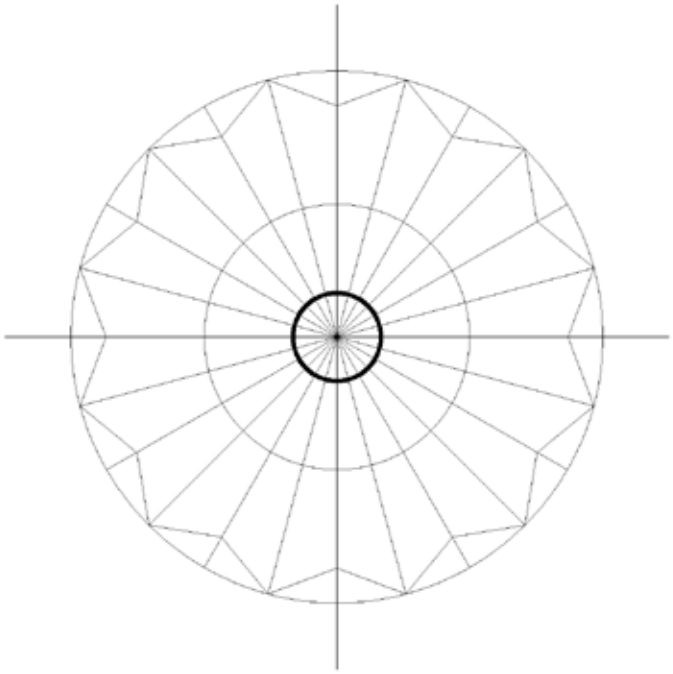
8) Set the pivot end of the trammel points at the center of the circle, and adjust the **radius** to meet the point of the 'diamond' lines you just made (point D). Swing the trammel points to make intersecting marks at every other line around the circle.



9) Snap chalk lines from the end of every other point around the circle, to meet the intersection points you just made.



10) Draw another circle one half the **diameter** of the main circle.



11) Draw another circle approximately one third the **diameter** of the last circle you made. The lines inside of this circle will not be cut, and can be erased or covered with objects (bricks, etc.) as a reminder not to cut them.

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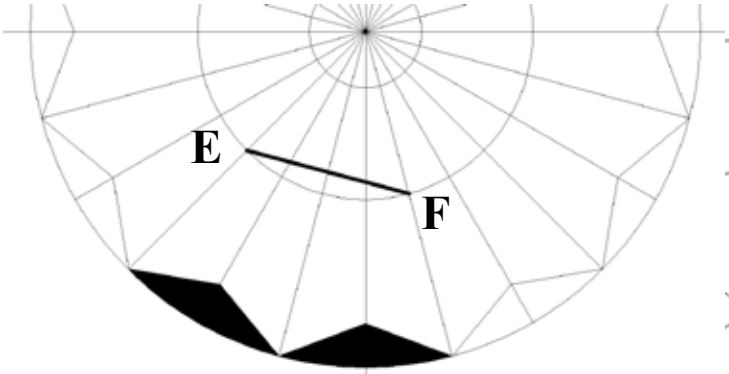
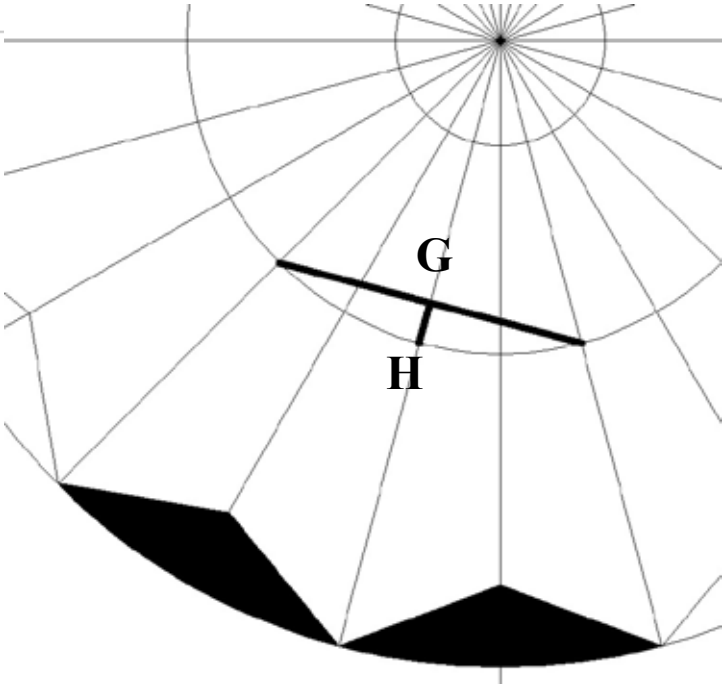


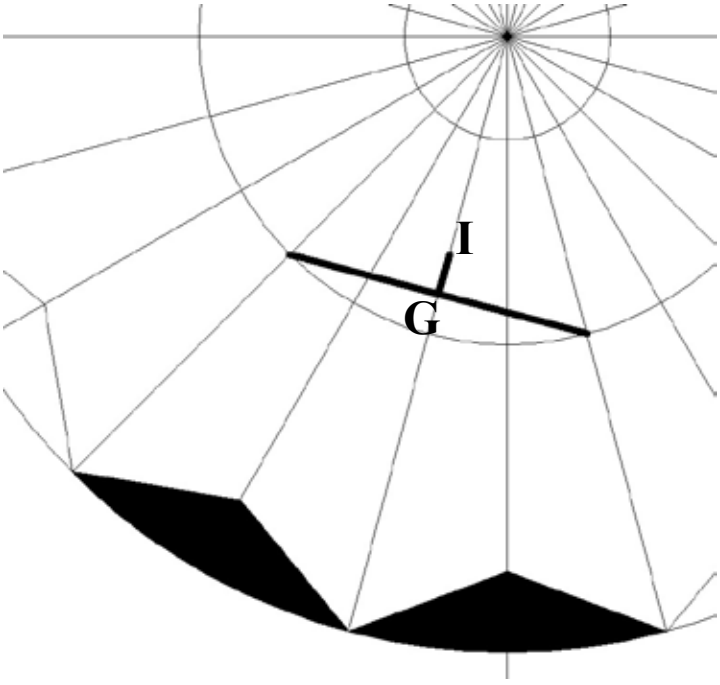
2 OUTER DIAMONDS

12) The proportions of the 'inner' set of diamond is also up to personal preference. However, the above method gives a nice appearance.

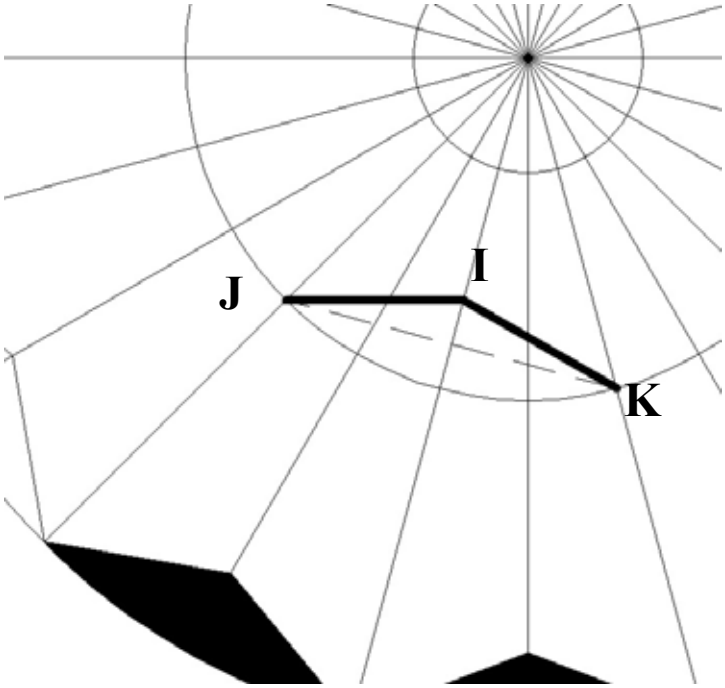
Set up the inner 'diamond' shapes by drawing a line from point E to point F. This sector of the circle includes 2 outer 'diamond' shapes, as shown above.



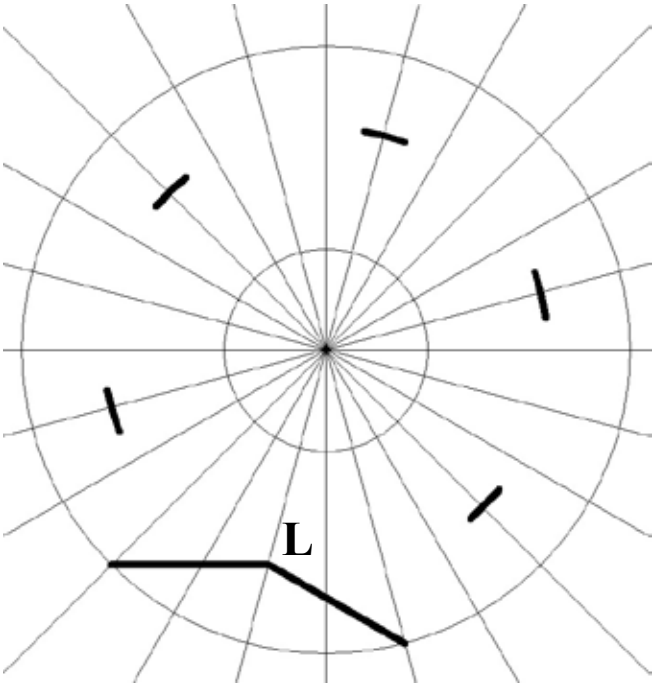
13) Measure from point G to point H.



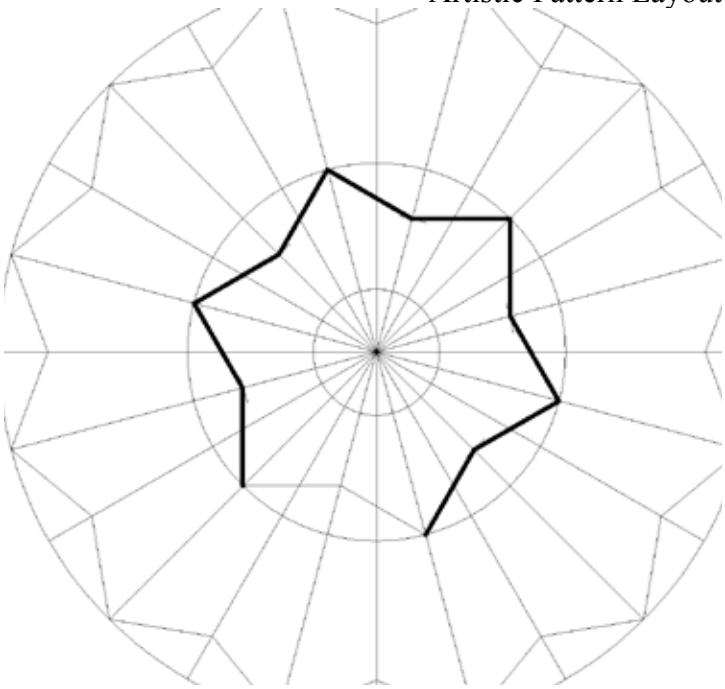
14) Measure from point G in the opposite direction, and make an intersecting mark on the line at point I.



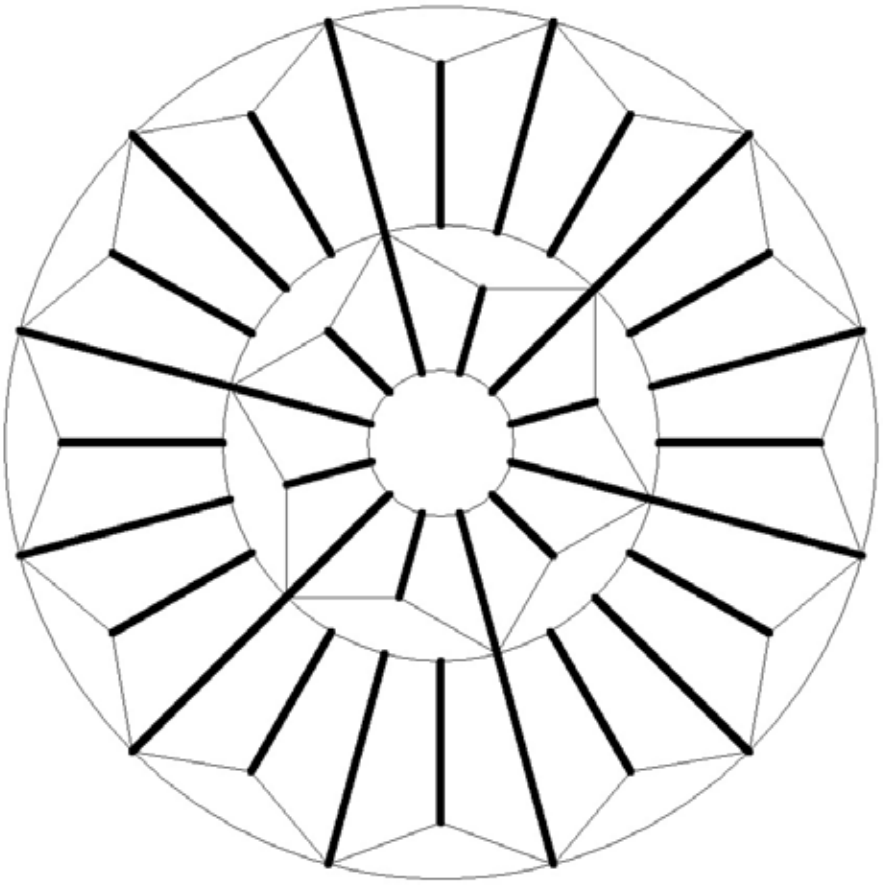
15) Draw lines from points J and K, to point I. The first inner 'diamond' shape is complete.



16) Set the pivot end of the trammel points at the center of the circle, and adjust the **radius** to meet the point of the 'diamond' lines you just made (point L). Swing the trammel points to make intersecting marks at every 4th line around the circle.



17) Snap lines from the new intersecting points, as shown above, to complete the inner 'diamond' shapes.



18) The dark lines shown to the left need to be cut as shown. The 3 circles and the points of the 'diamond' shapes will also be cut.

Study your layout to ensure that the pattern repeats, and that you do not cut any lines that fall within what is supposed to be a solid shape.

Placing *tape, rocks, bricks, or other objects over portions of your chalk lines will help to remind that these lines do not get cut.

CAUTION: *Use blue painter's tape only on your concrete surface and remove it within a couple of hours. Other types of tape will adversely affect the way concrete accepts stain, leaving your concrete with permanent tape marks.

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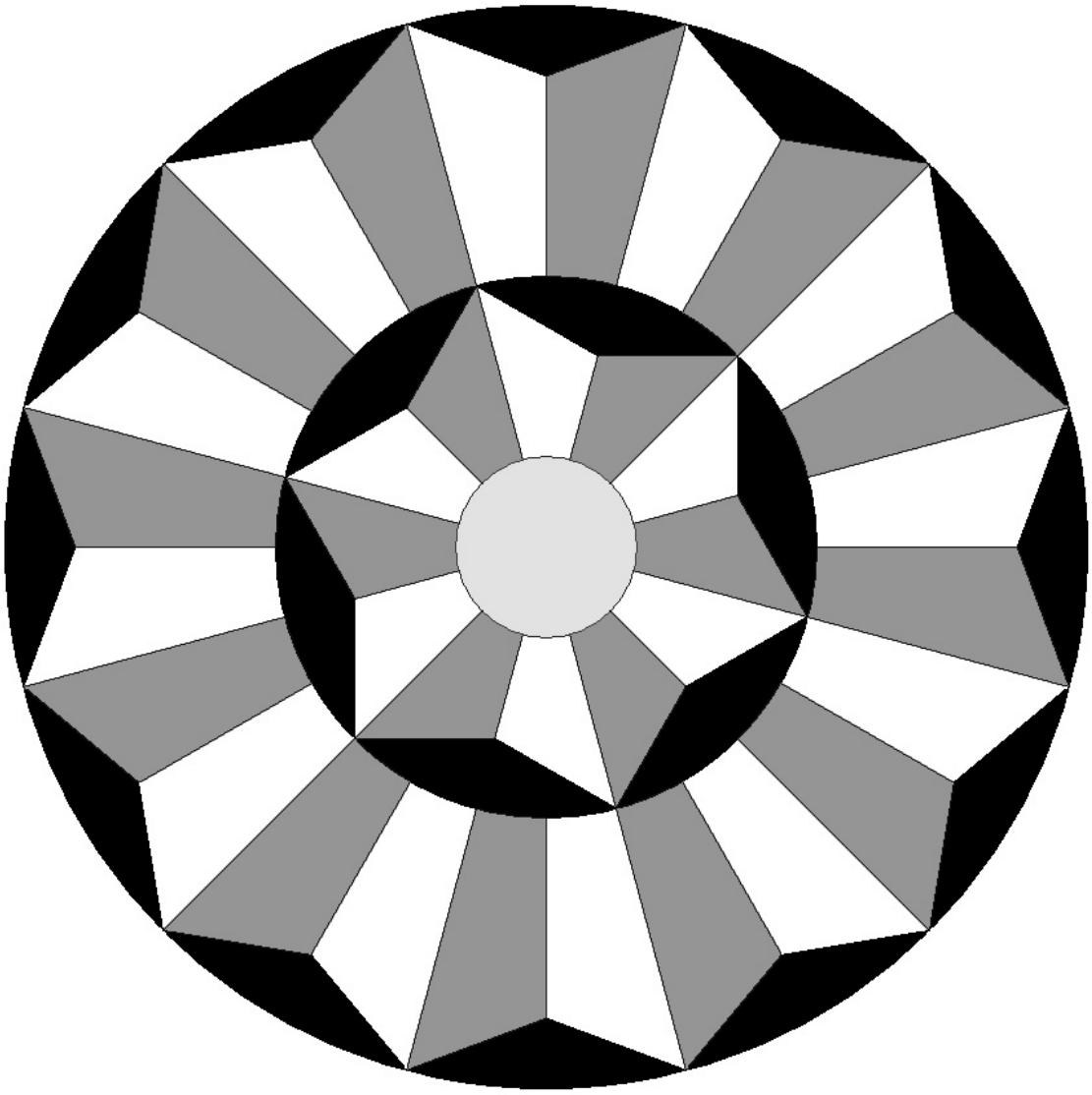

19) The finished geometric pattern, shown with shading to represent various stain colors.

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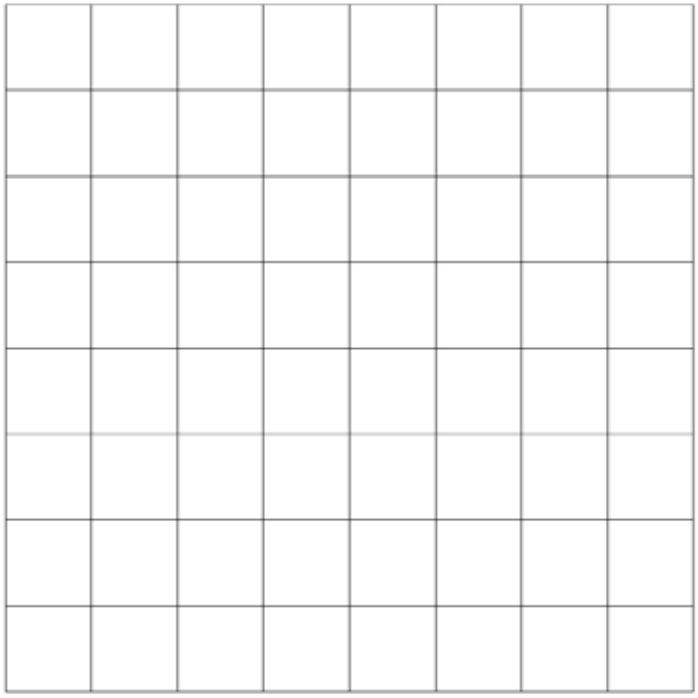
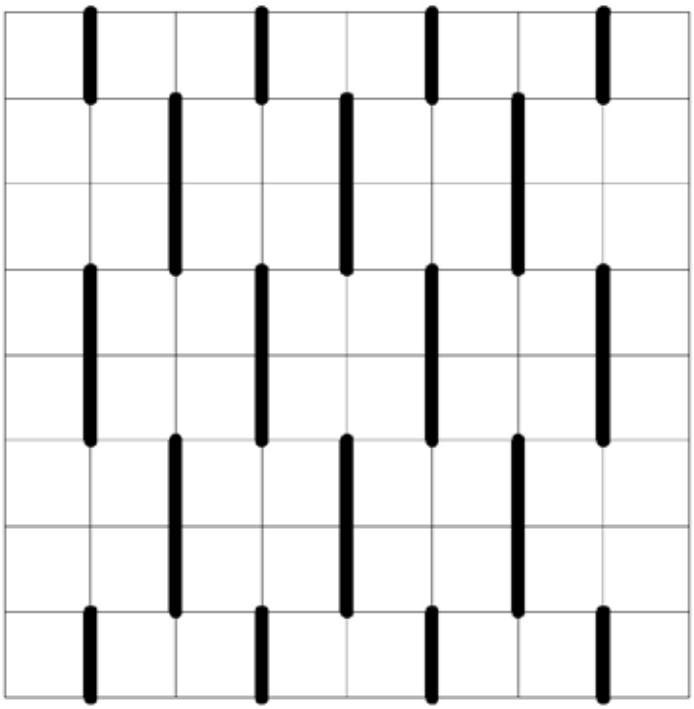
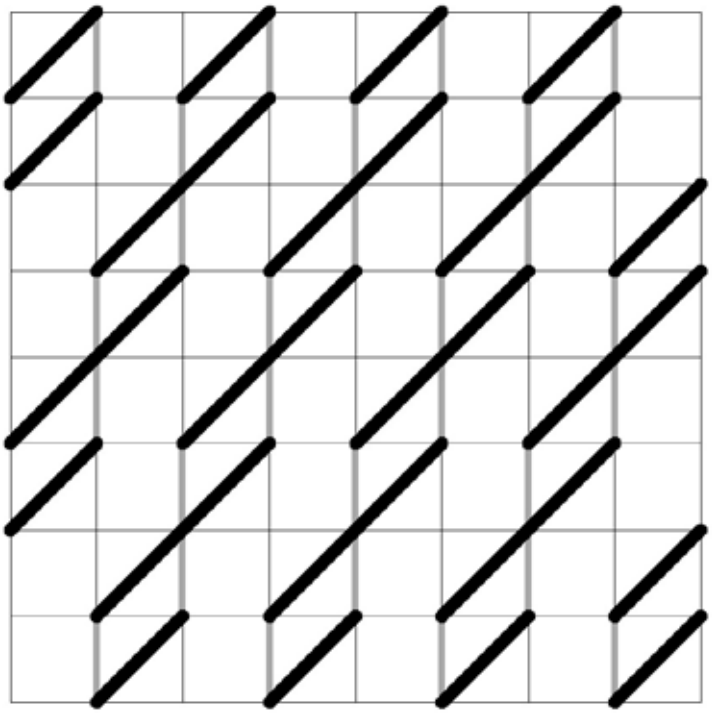
3D TILE PATTERN



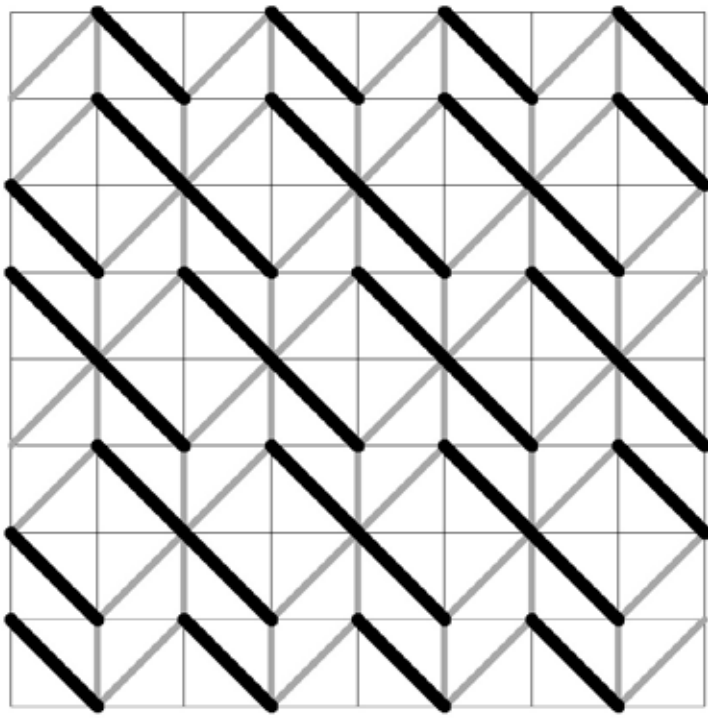
1) Begin with the basic crosshairs, then divide the slab into square tiles using chalk lines. This example shows a 12’ x 12’ slab divided into 18” x 18” tiles.



2) Cut every other vertical line, as shown in the above drawing. Each cut should include 2 tile sections, except for the cuts at the edges of the slab.



3) Cut 45-degree lines to and from the endpoints of your last cuts, as shown above. Each cut will bisect a previous cut.



4) Cut 45-degree lines to and from the same endpoints, but in the opposite direction. Each cut will bisect the cuts made in step 2.

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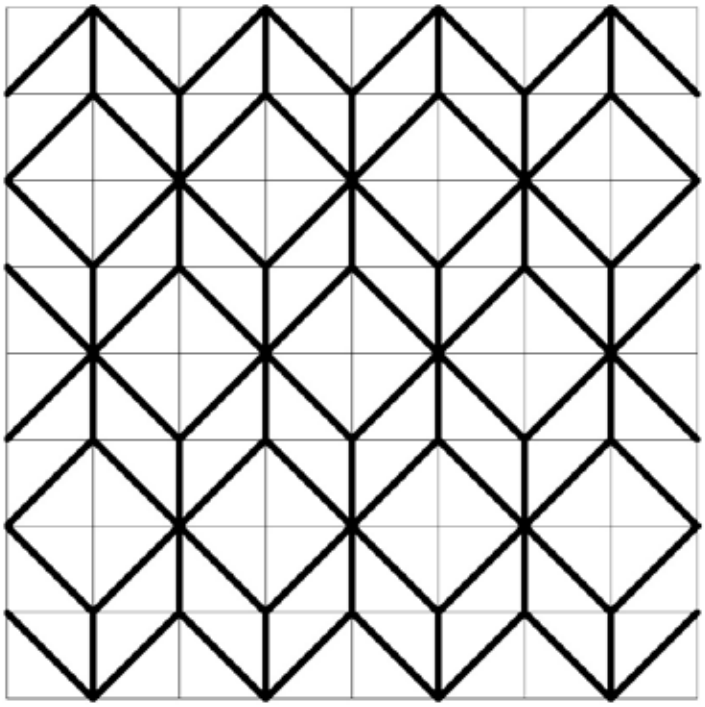
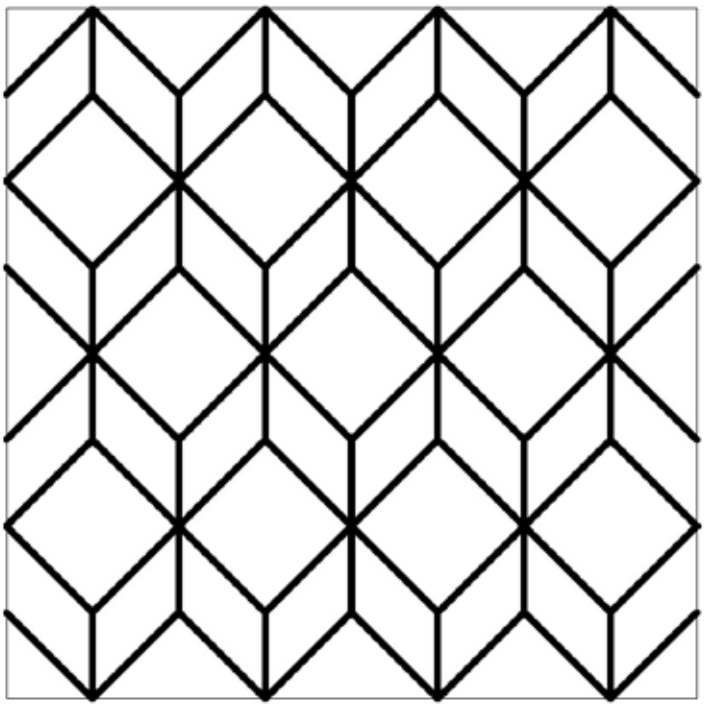
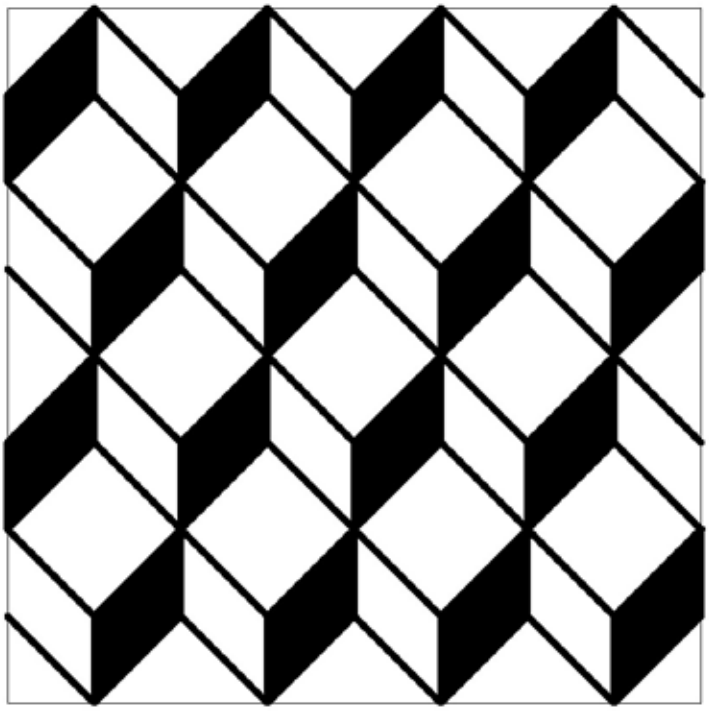


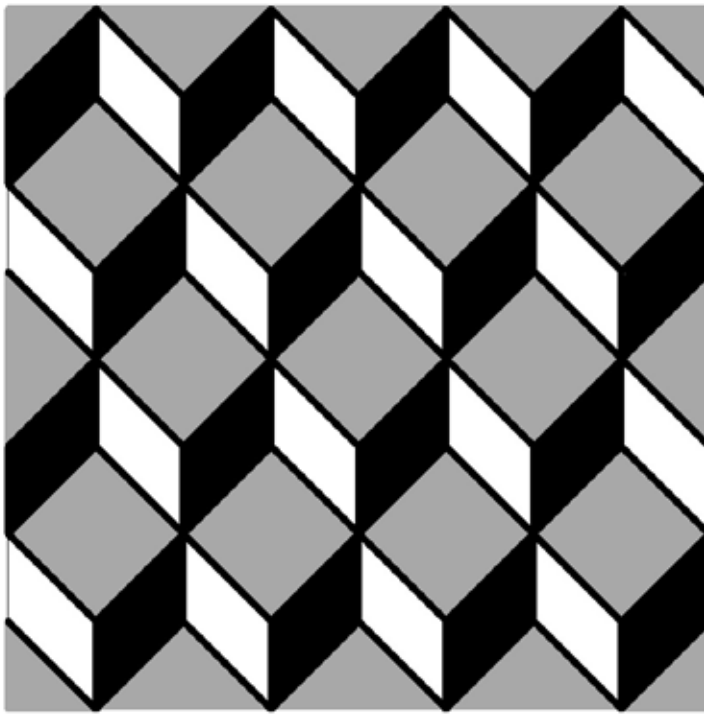
5) All cuts completed.



6) Clean all un-cut chalk lines from the slab.



7) Stain the diamonds shapes at the lower/right hand corner of each square, using a dark color. Notice how this brings out the illusion of nested cubes.



8) Stain the square shapes a medium color, and the remaining diamond shapes a light color. The 3D pattern is complete.

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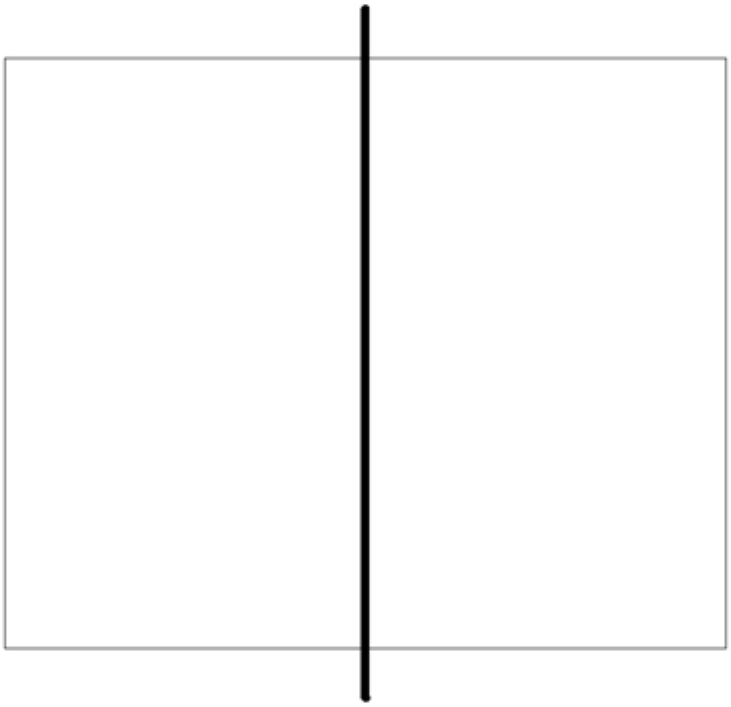
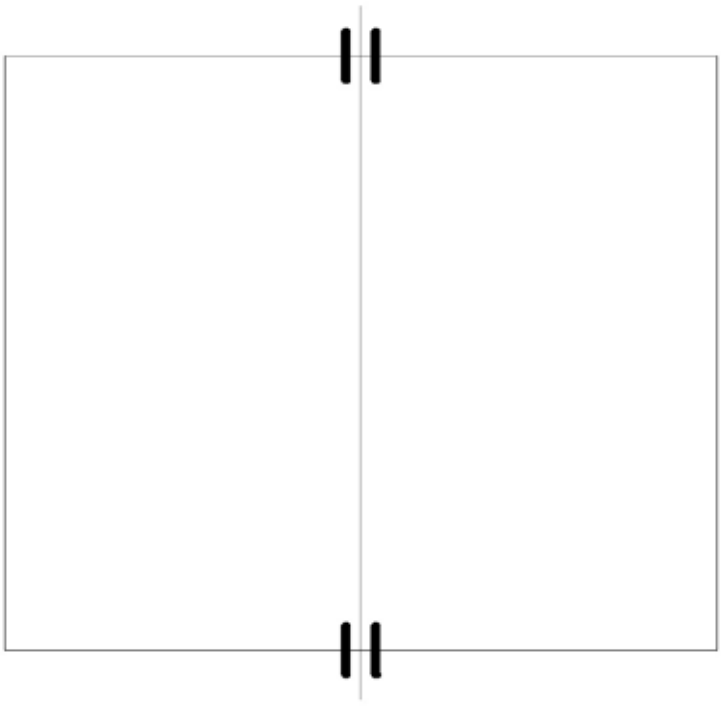
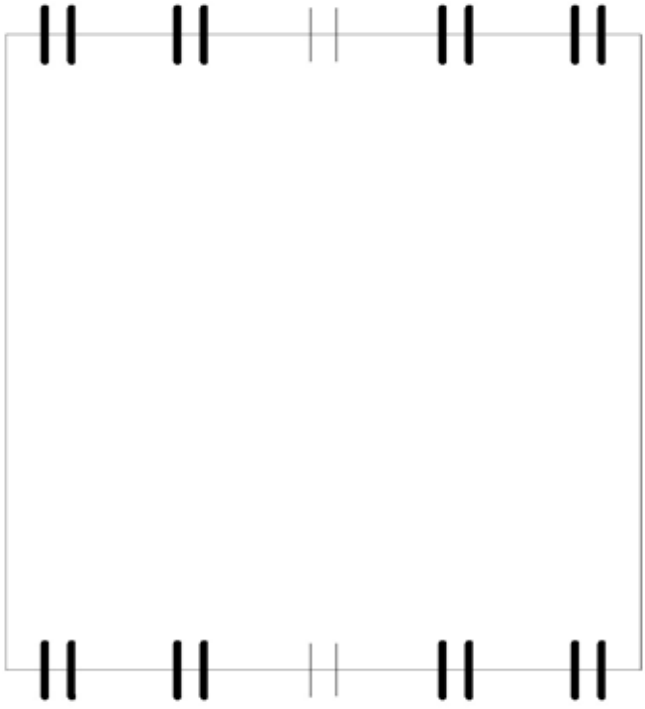
DIAMOND PATTERN



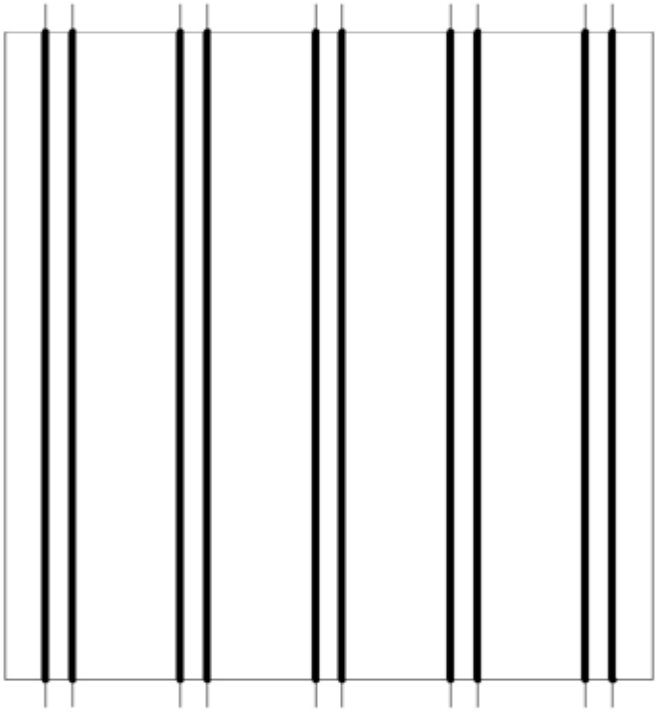
1) Divide the 12’ x 12’ slab in half with a reference line.



2) Place marks at the edge of the slab, 3 inches on each side of the reference line. This will create a 6-inch wide ribbon.



3) Copy the center ribbon marks every 30 inches along the top and bottom edges of the slab.



4) Snap lines between all of the marks to create five 6-inch ribbons.

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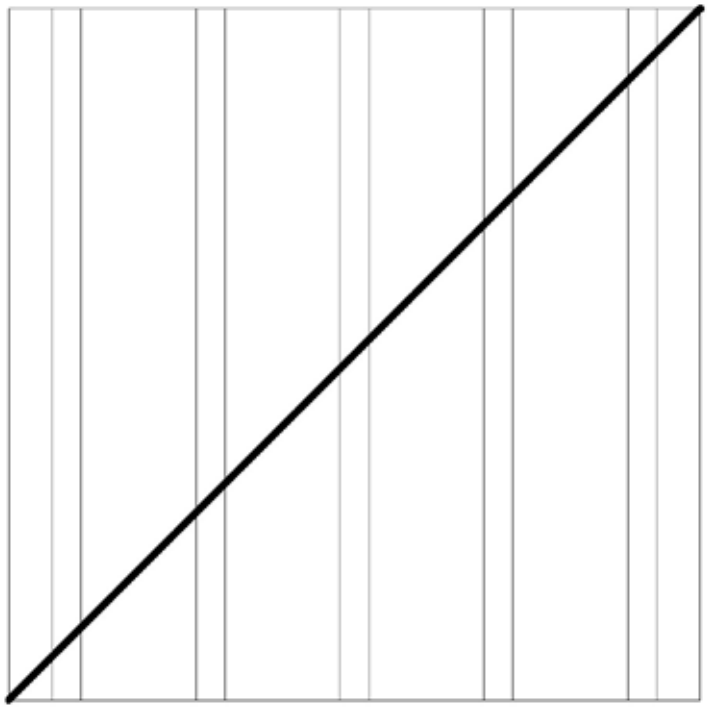
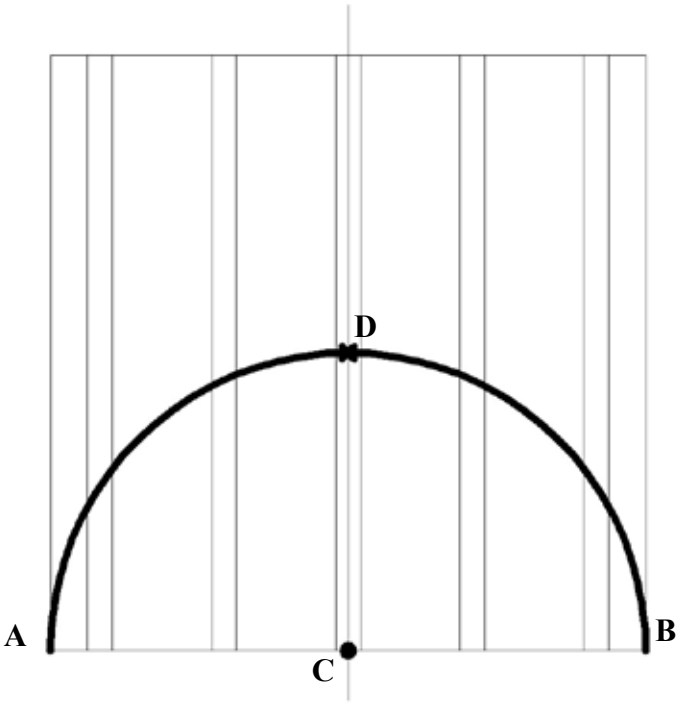
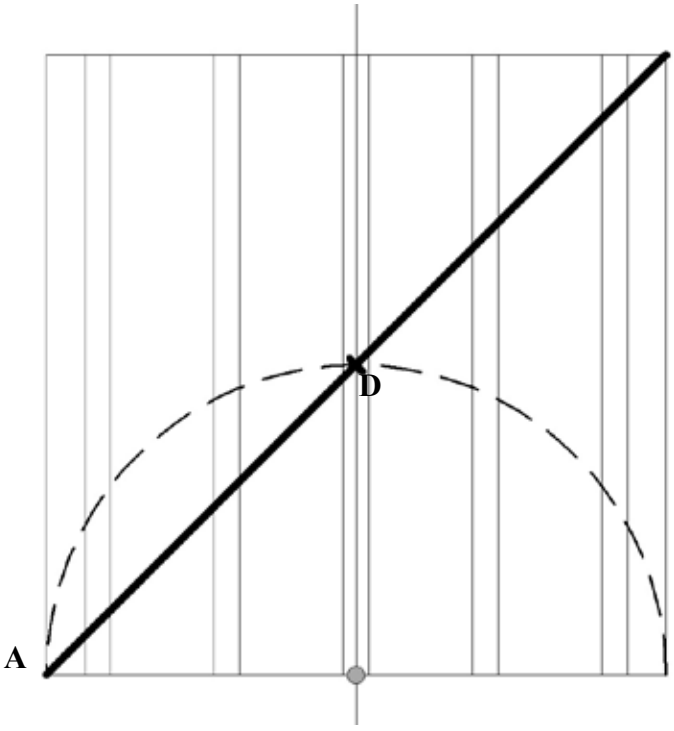


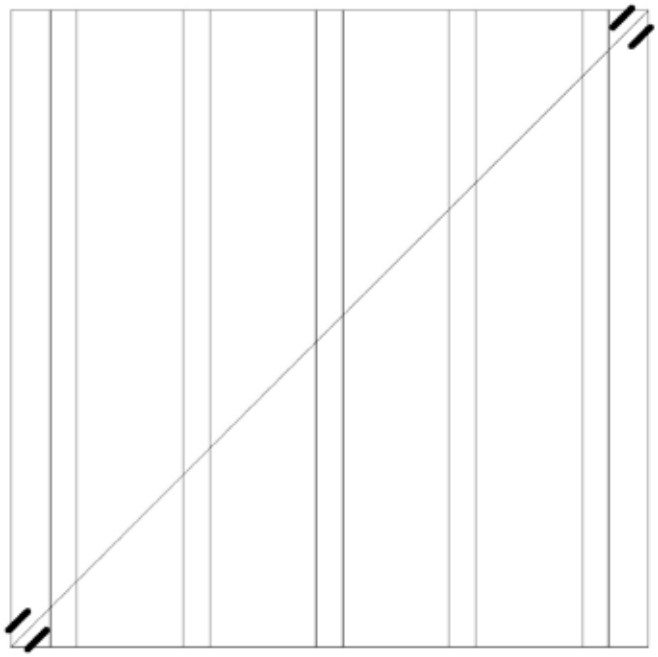
5) Snap a 45-degree reference line. If the slab is square, simply snap the line from opposing corners.



6) If the slab is rectangular, swing an arc from point A to point B, using point C as the center of the arc. This creates a crosshair at the first reference line (point D).



7) Snap a 45-degree reference line from point A and extend the line <u>through</u> point D to the other side of the slab.



8) Just as in step #2, make marks on both sides of the new reference line, 3" in both directions.

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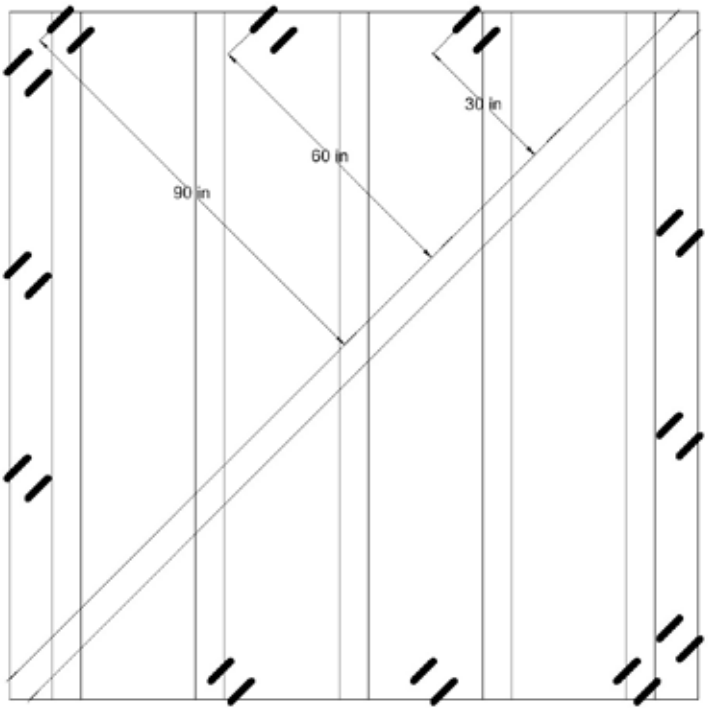
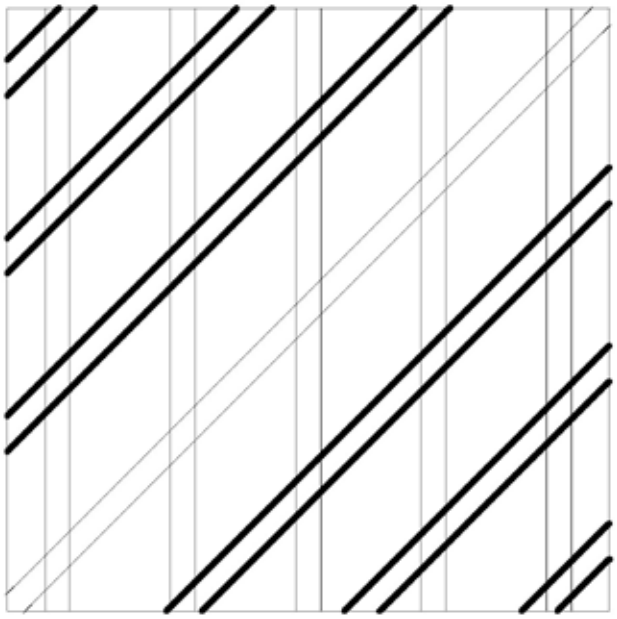
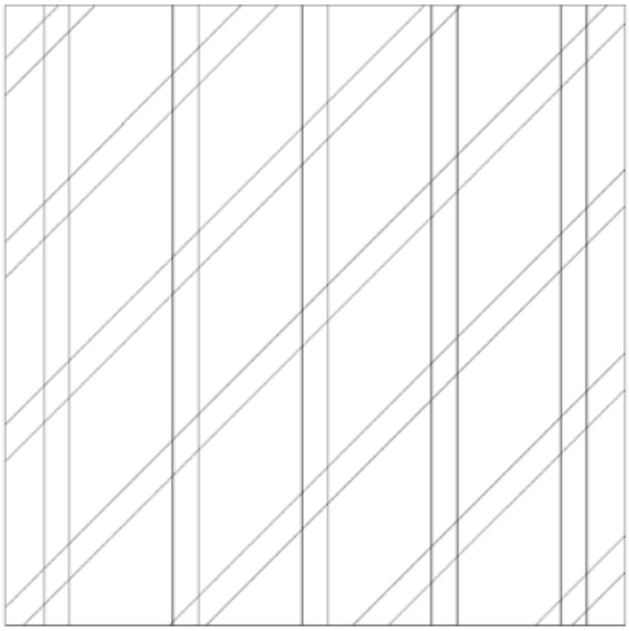


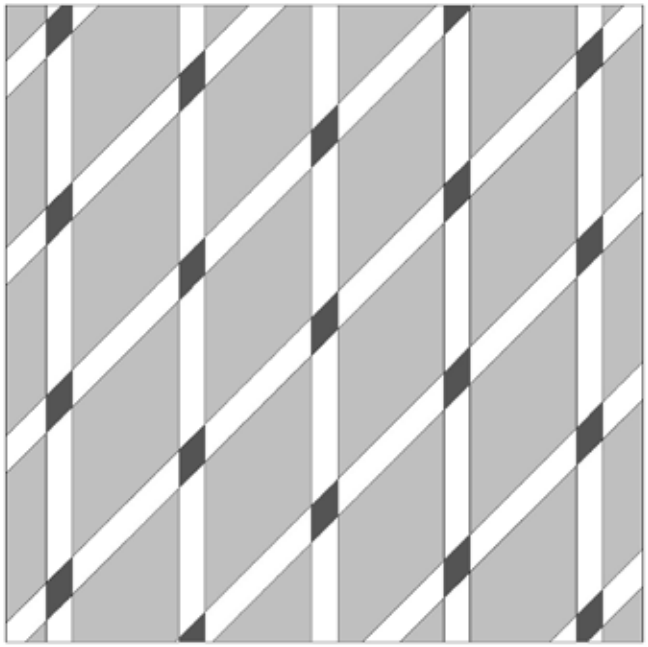
9) Measure perpendicularly from the main ribbon lines in order to place marks around the perimeter of the slab.



10) Snap lines from opposing marks around the perimeter of the slab.



11) Cut all lines completely through.



12) The finished pattern, shown here with shaded diamonds.

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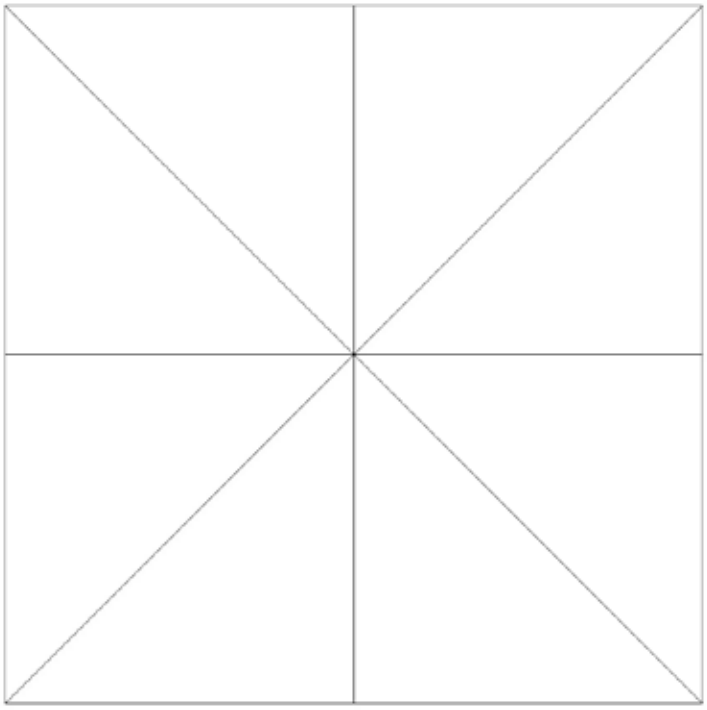
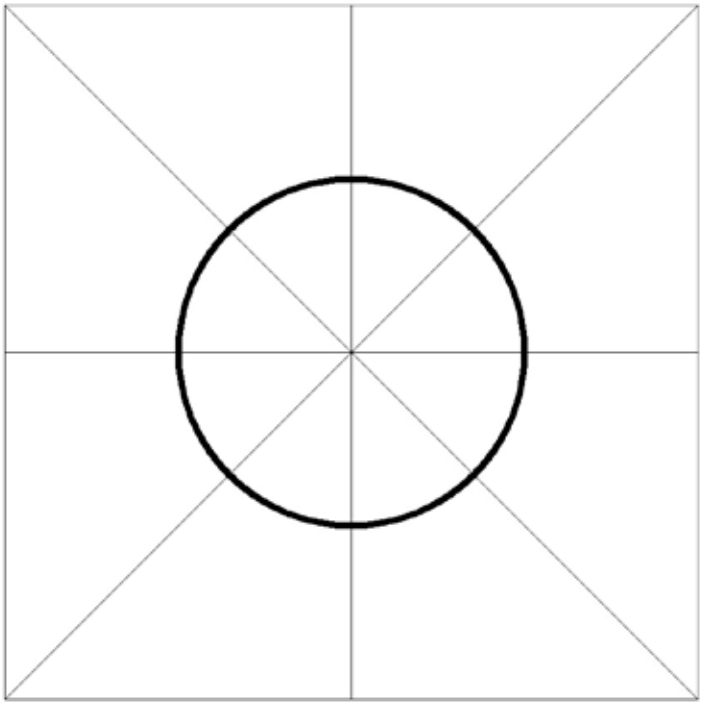
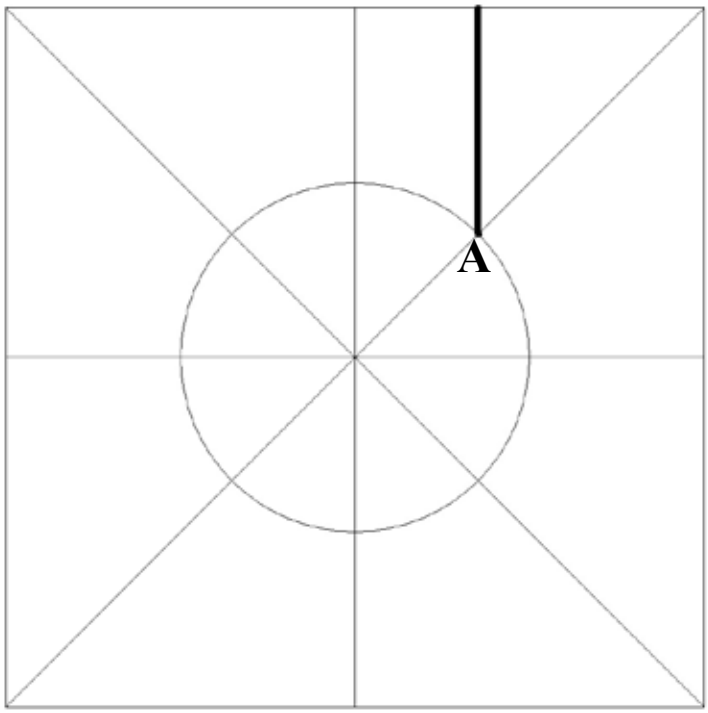
Swirling Arc Pattern 1



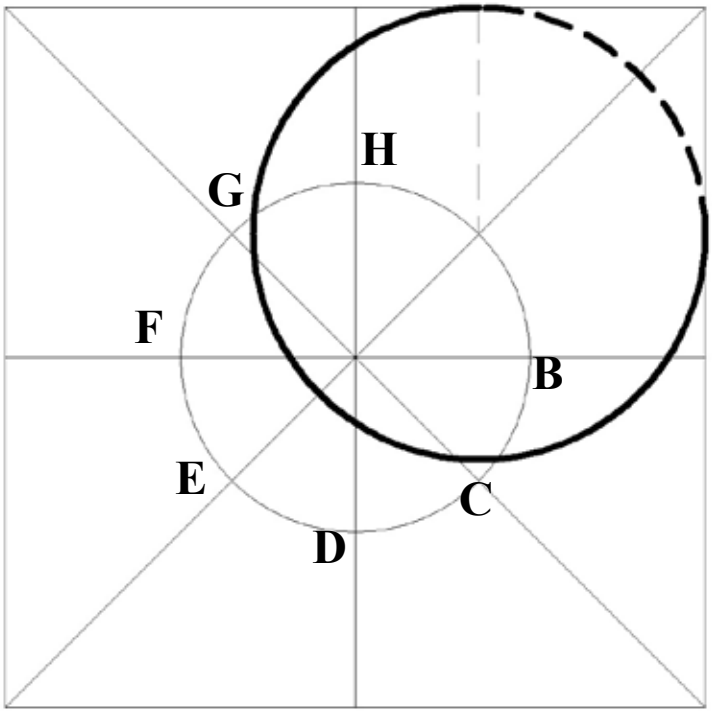
1) Begin with the basic crosshairs, then snap 45-degree chalk lines from corner to corner. This example shows a 12' x 12' slab.



2) Use trammel points with soapstone to draw a circle at the center of the crosshairs. The **diameter** of the circle should be half the width of the slab (6' in this example). If your slab is rectangular, use half the width of the widest side.



3) To find the **radius** of the main arcs, measure from one of the 45-degree intersections (point A in this example) to the edge of the slab (or to your border). Set your trammel points to this **radius.** (In this example, the radius is 46-1/2 inches.)



4) Draw an arc from both edges of the slab, as shown above. The dashed portion of the circle does not need to be drawn, as it will not be used and will only be confusing later in the layout process. Repeat at points B through H.

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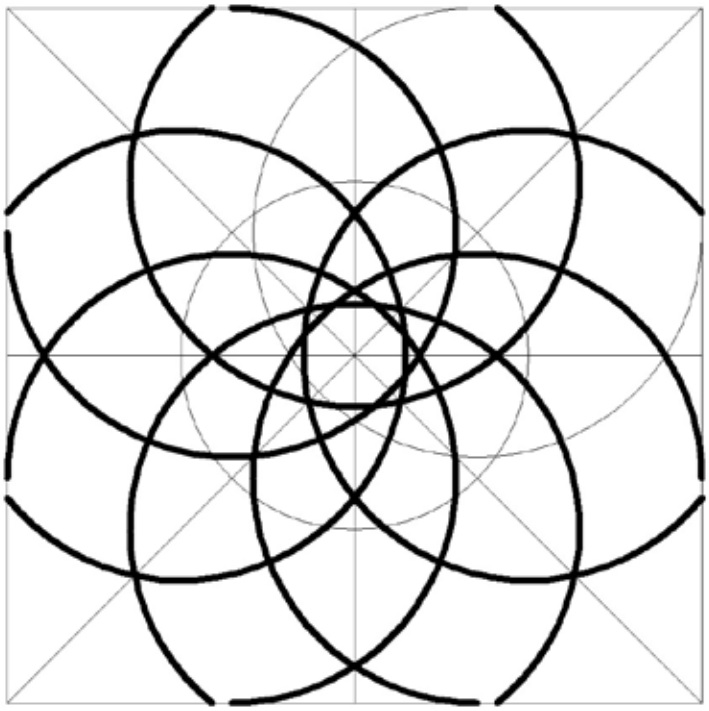
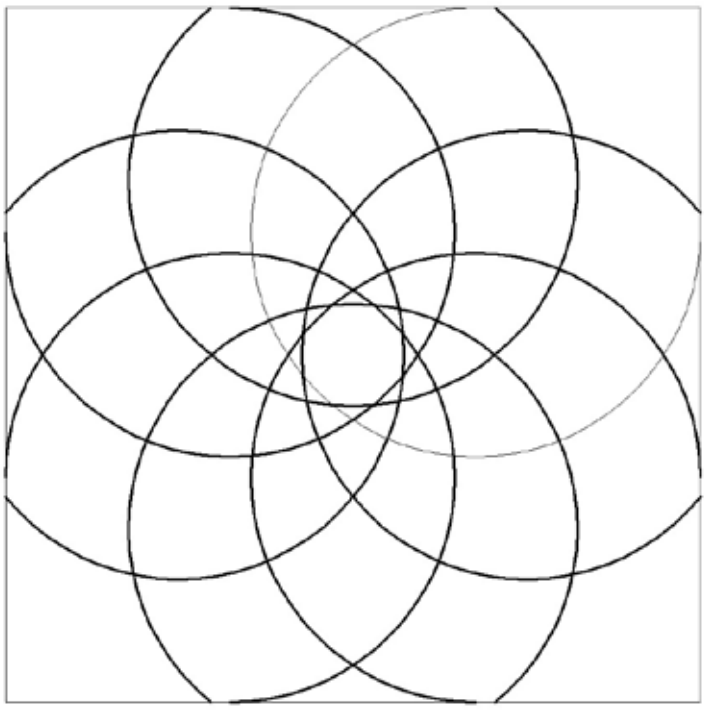
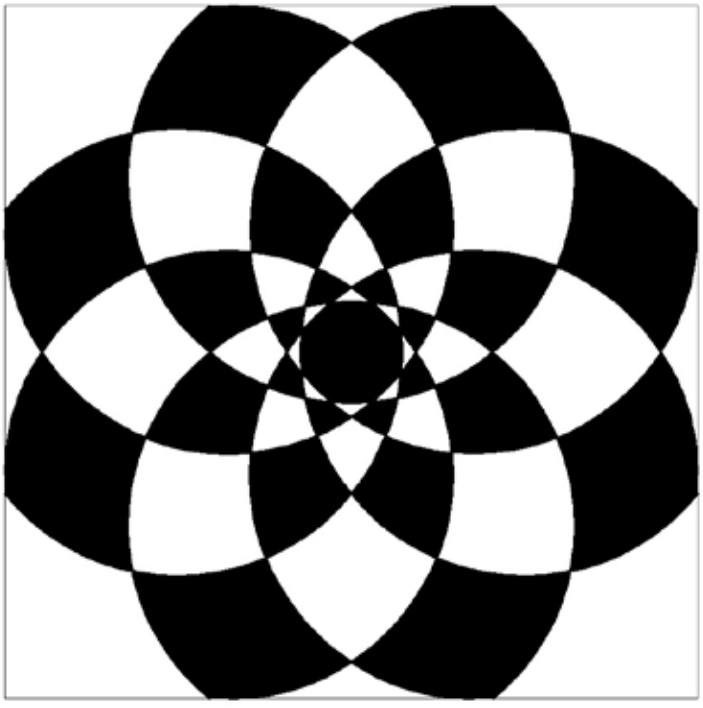


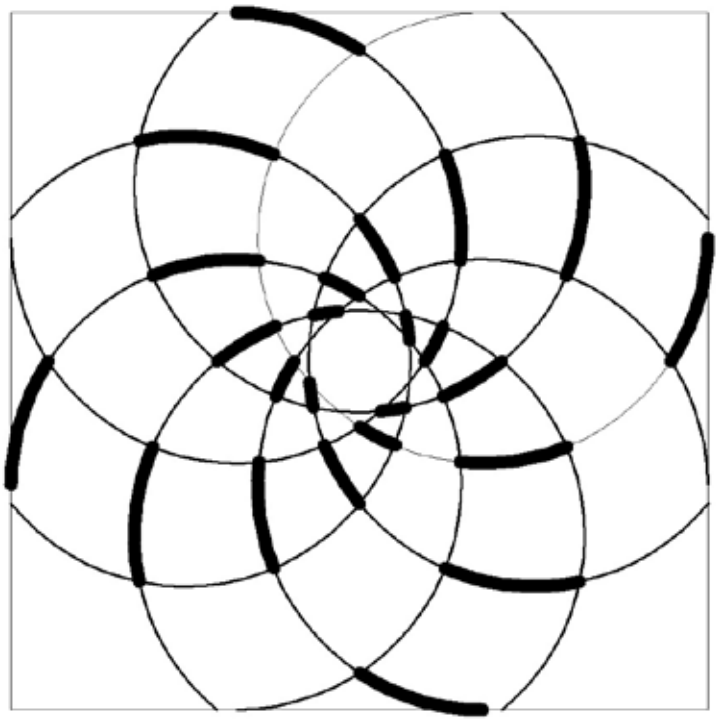
5) Continue around the circle, drawing arcs from each of the 7 additional intersection points (B through H, as labeled in the previous image).



6) All arcs shown with the setup crosshairs and setup circle erased.



7) Using these intersecting arcs, you can add stain to create the pattern above. For the swirling pattern, proceed to Step 8 (do not add stain.)



8) Erase the above line sections (thick black lines), or *tape them off as a reminder not to cut them. CAUTION: *Use blue painter's tape only on your concrete surface and remove it within a couple of hours. All other tapes will disrupt the stain process and leave permanent marks.

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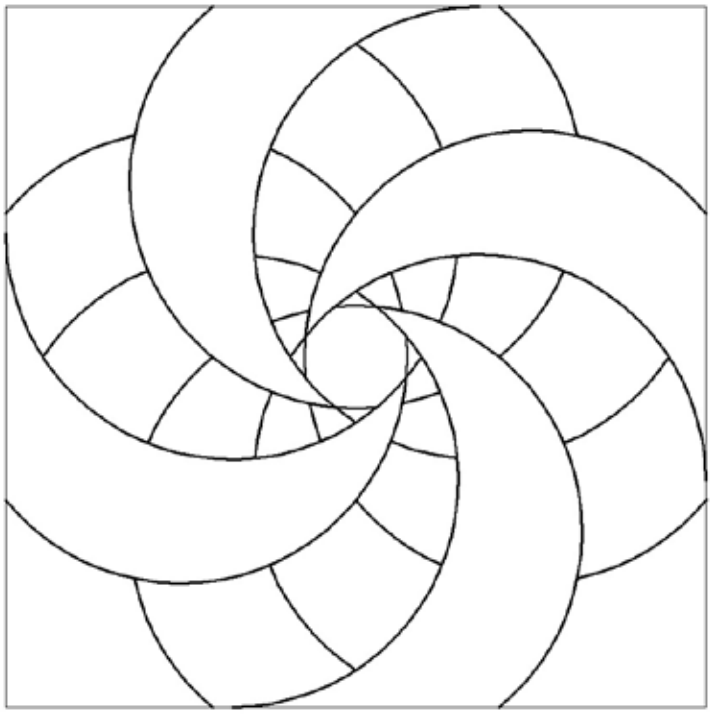
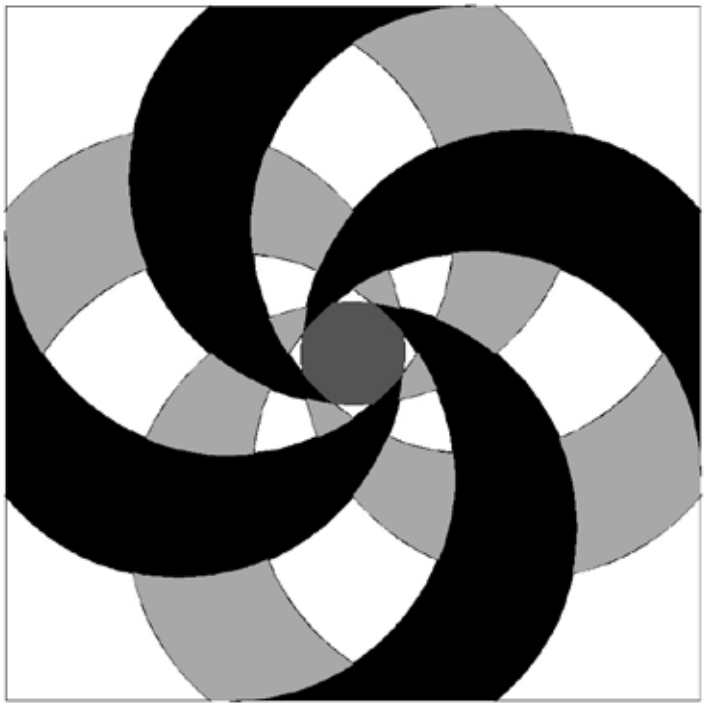
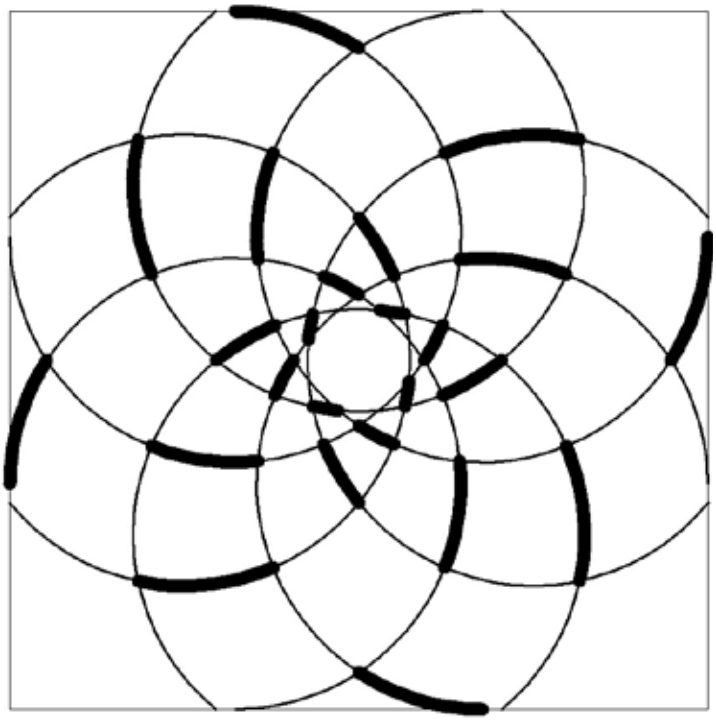


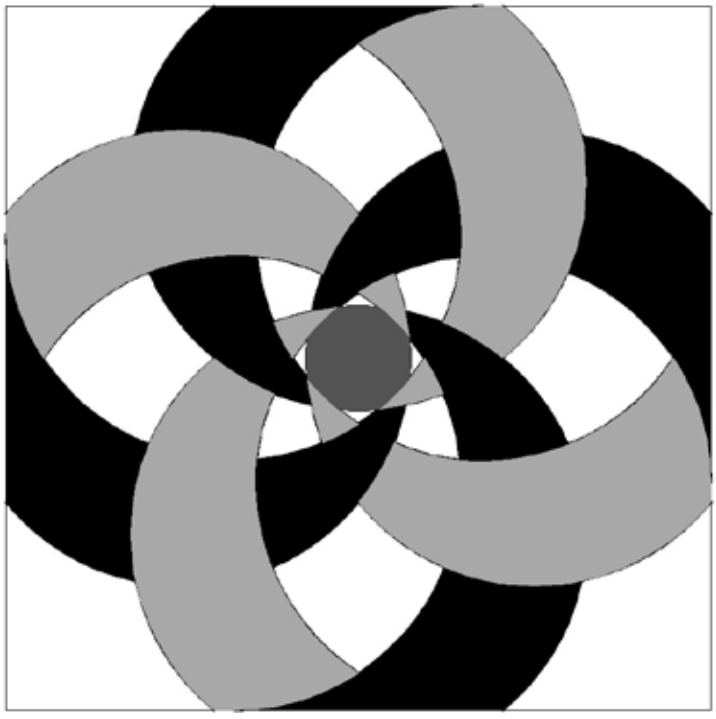
9) With the previously specified lines removed, a swirling ‘blade pattern’ becomes visible.



10) Stain the ‘blades’ to your preference to create a very interesting design.



11) Optionally, you can create ‘weaved’ swirling blades by erasing the above highlighted line sections (rather than the ones shown in step #8).



12) Stain the ‘blades’ to finish the pattern.

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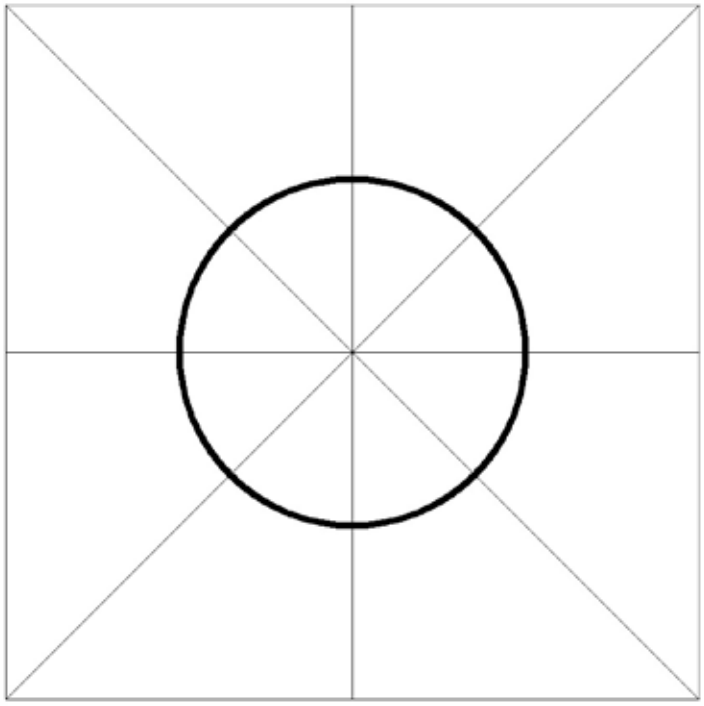
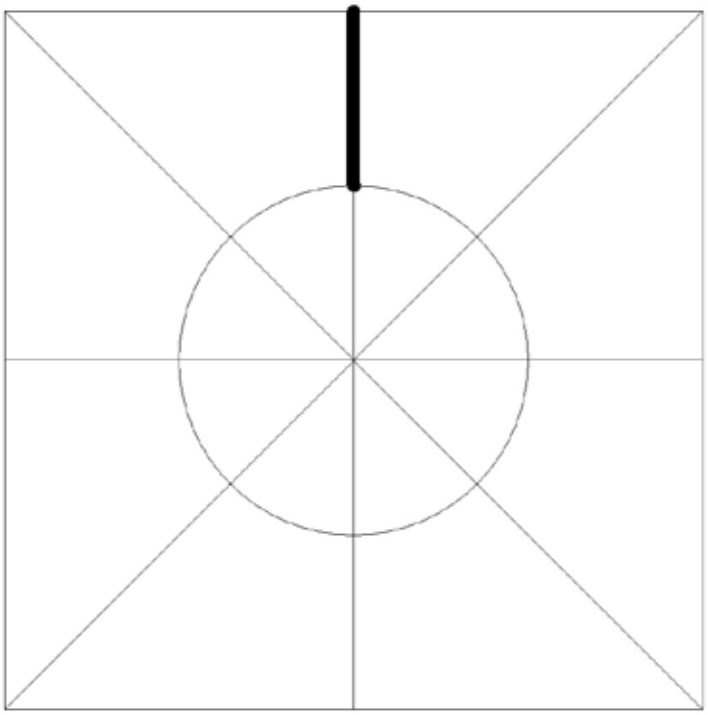
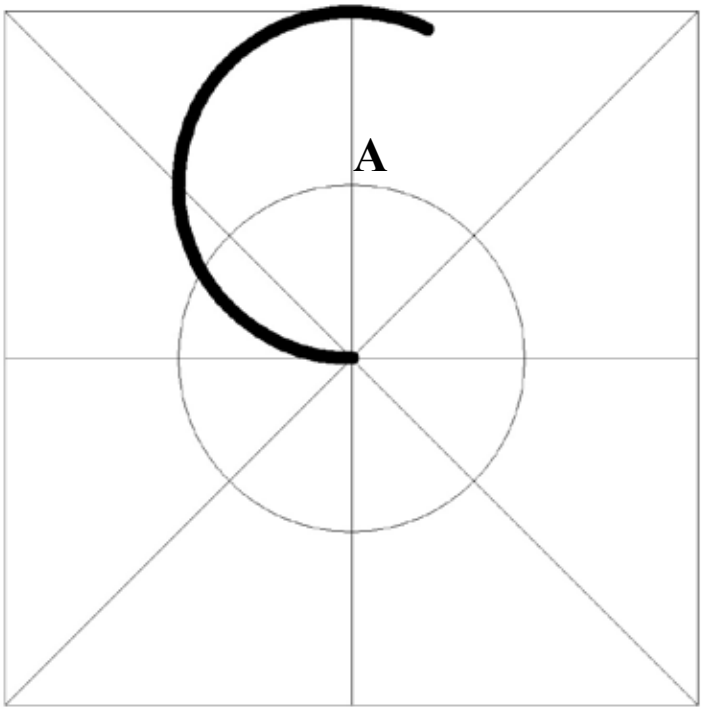
Swirling Arc Pattern 2



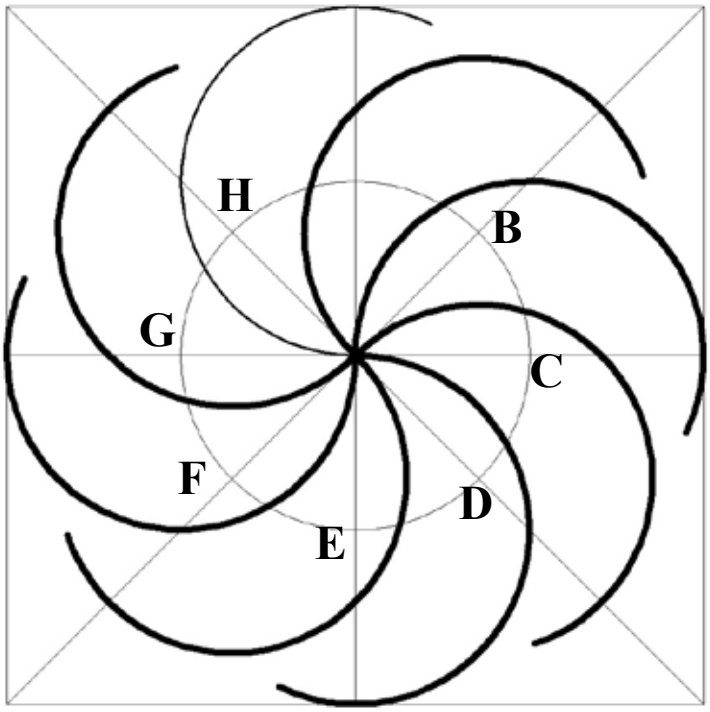
1) This pattern begins with the same initial set-up as the previous design (Page 29, Steps 1 & 2). Again, this example shows a 12' x 12' slab with a 6' **diameter** circle in the center.



2) Since the **radius** of the center 'set-up' circle is 3 feet, your trammel points will already be set at the proper **radius** for the main arcs. (This distance is 36 inches in this example.)



3) Draw a half circle using point A as the center of the arc. You can draw the arc facing either direction. (For this example, the blades will be swirling counter-clockwise.) Start the arc at the center of the slab, and make the arc slightly past the centerline, as shown above.



4) Move from point to point (points B through H, as shown above) on the set-up circle and draw 7 more arcs like the one you just drew.

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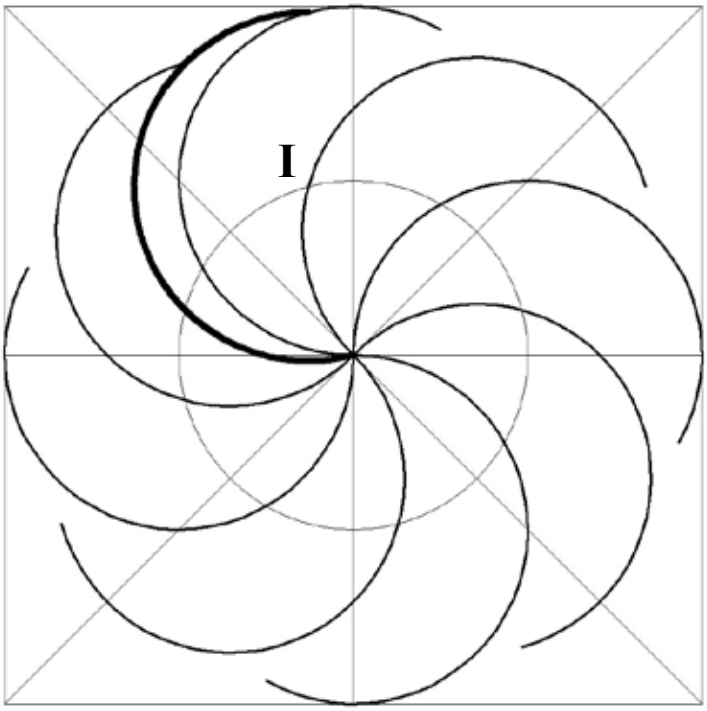
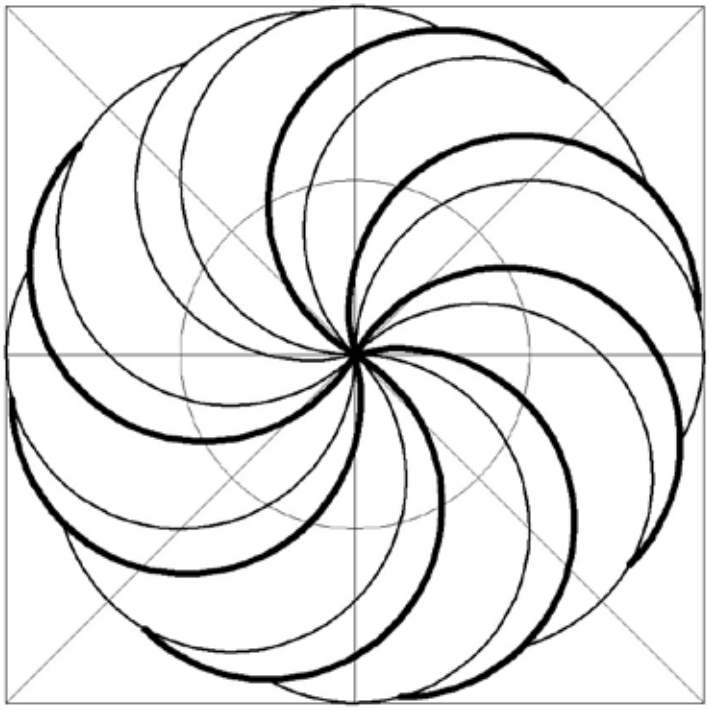
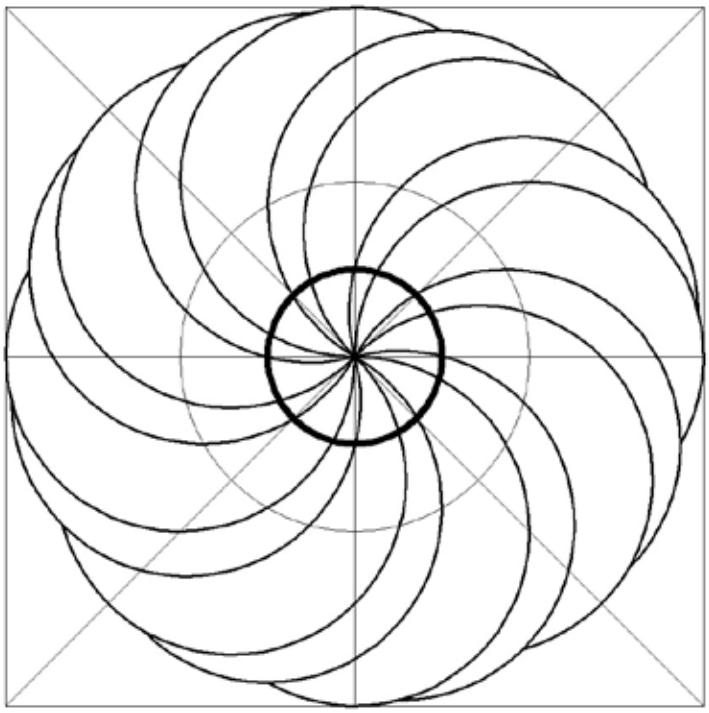


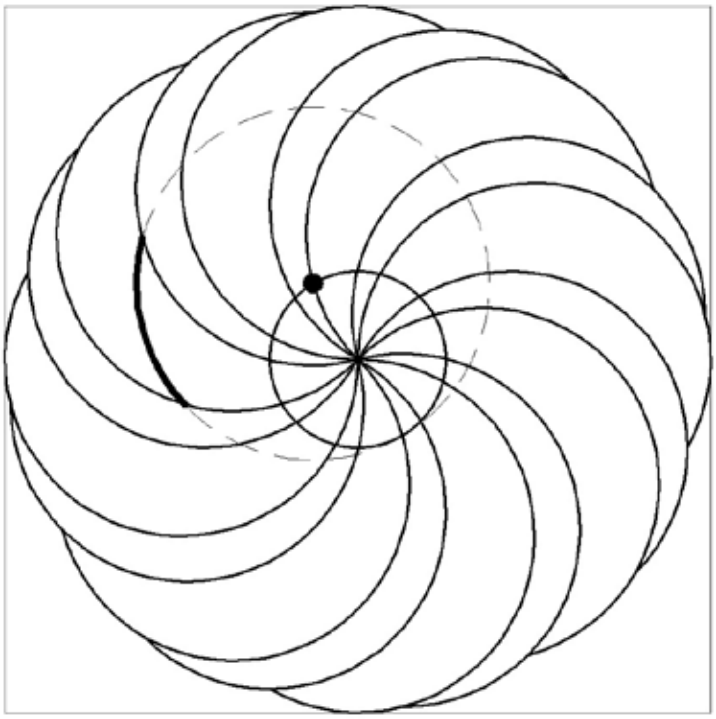
5) Now draw another set of arcs that are slightly offset (rotated) from the first set. The center-point of these arcs will be where the first set of arcs intersect the set-up circle (point I, above).



6) Again, move from point to point around the set-up circle and draw 7 more arcs. Be careful not to draw your arcs from the intersections made with these new arcs. It is recommended that you draw a light circle around the correct intersection points before you proceed drawing the 2nd set of arcs.



7) Draw a second set-up circle at the center of the slab, with a **diameter** 1/2 the size of the first set-up circle. (In this example, the second set-up circle is 36 inches in diameter.)



8) Re-set the trammel points to the first **radius** setting (3 feet in this example). Where the first set of arcs intersect the small set-up circle (the black dot above), draw an arc between the first and second set of arcs. Do not draw the dashed portion of the arc.

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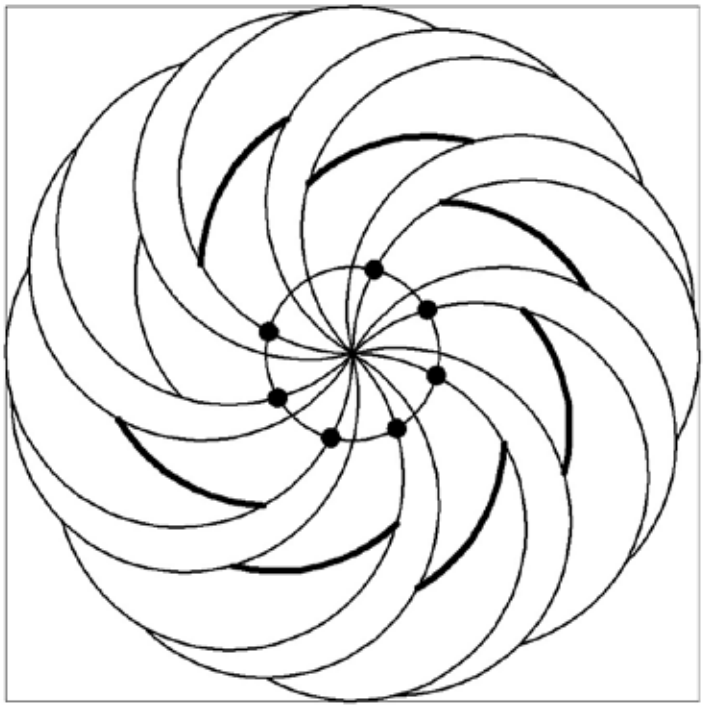
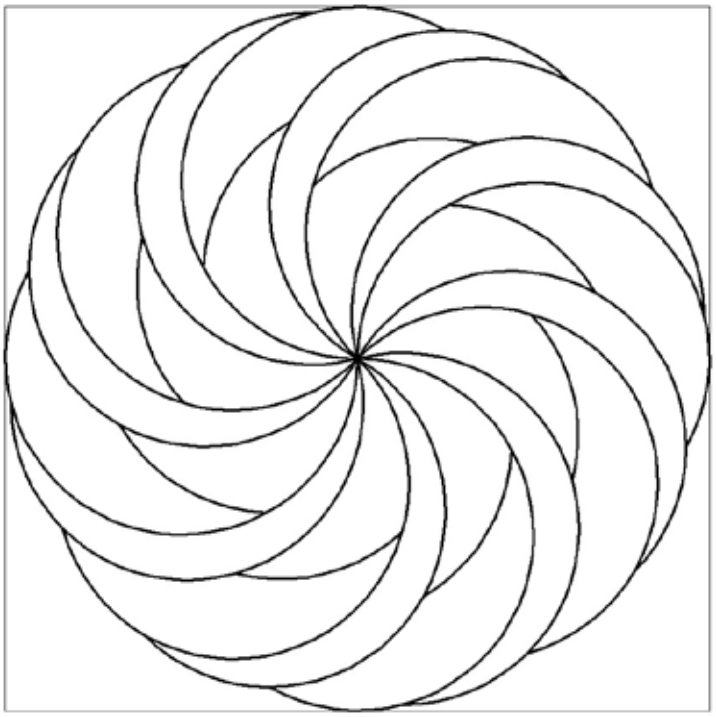
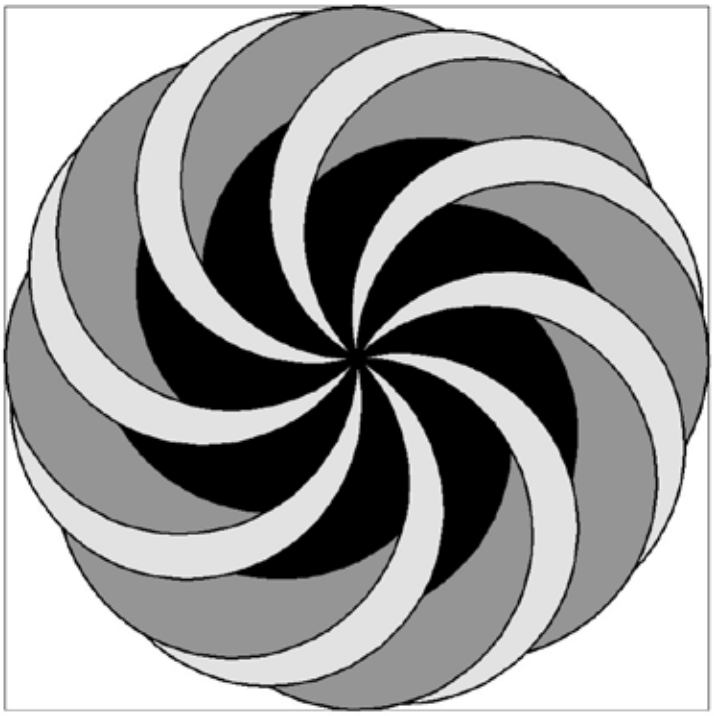


9) Move from point to point around the set-up circle (the black dots, above) and draw 7 more arc segments, as shown.



10) All arcs drawn, with crosshairs and set-up circles removed.



11) The completed design with shading to represent 3 colors of stain.

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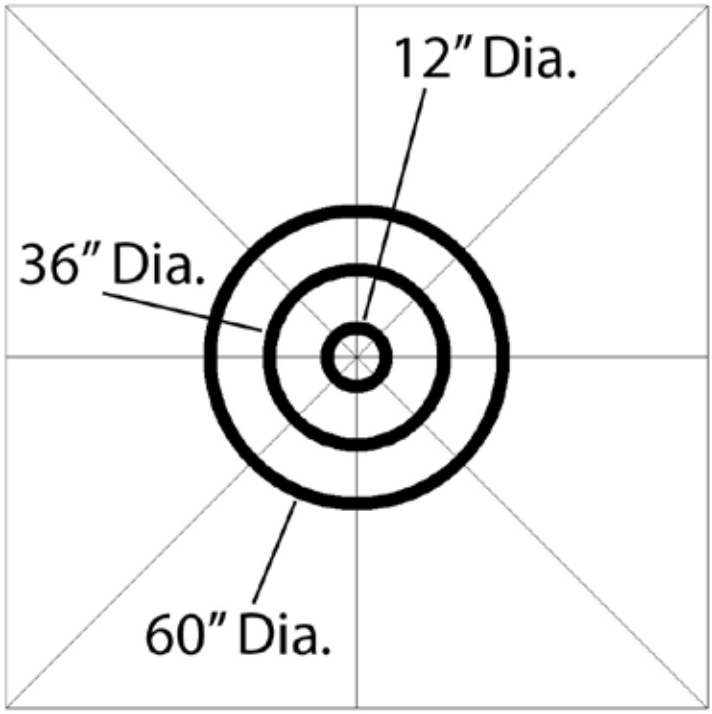
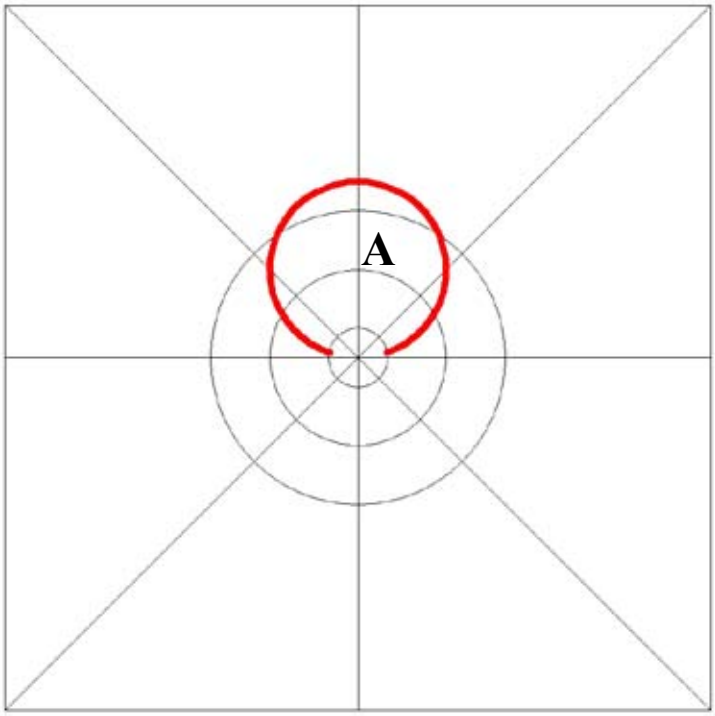
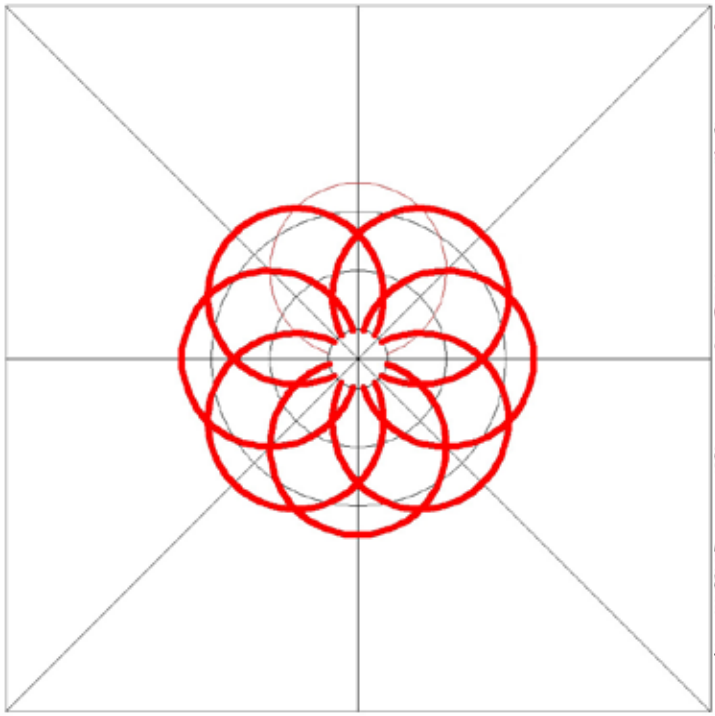
Swirling Crescents



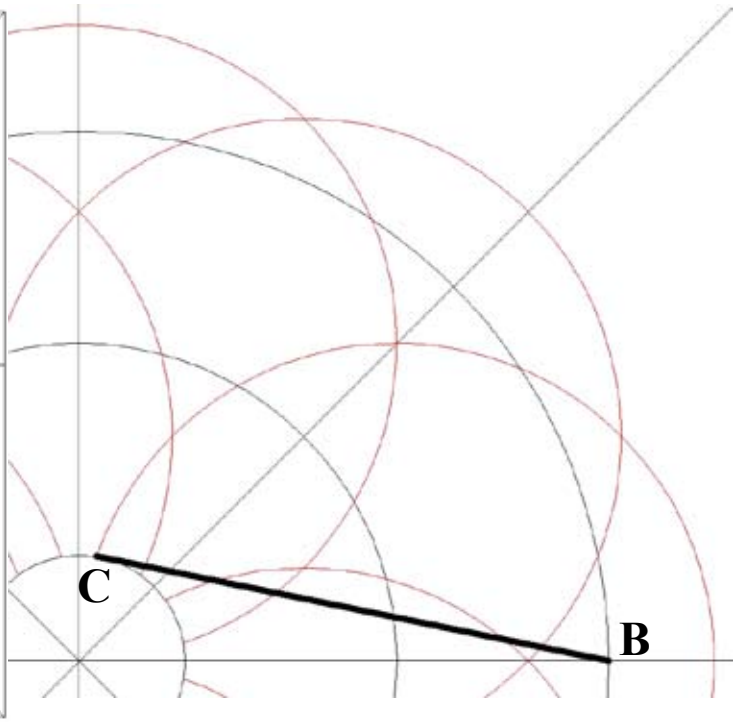
1) Begin with standard 90-degrees and 45-degrees crosshairs, then draw 3 circles from the center-point: 12”, 36”, and 60” **diameters,** respectively.



2) With the trammel points set at an 18” **radius** (36” diameter), draw an arc that touches the center circle at 2 points, with point A being the center of the new arc.



3) Continue around the 36” **diameter** circle, and draw 7 more arcs as shown above. The center of each arc should be where the crosshair lines intersect the 36” diameter circle.



4) Set the trammel point at point B (90-degree crosshair intersection with the 60” circle) and adjust the trammel points to point C (Where the 3rd arc (clockwise) meets the 12” circle). The new **radius** is 29.6” (or 29-5/8”)

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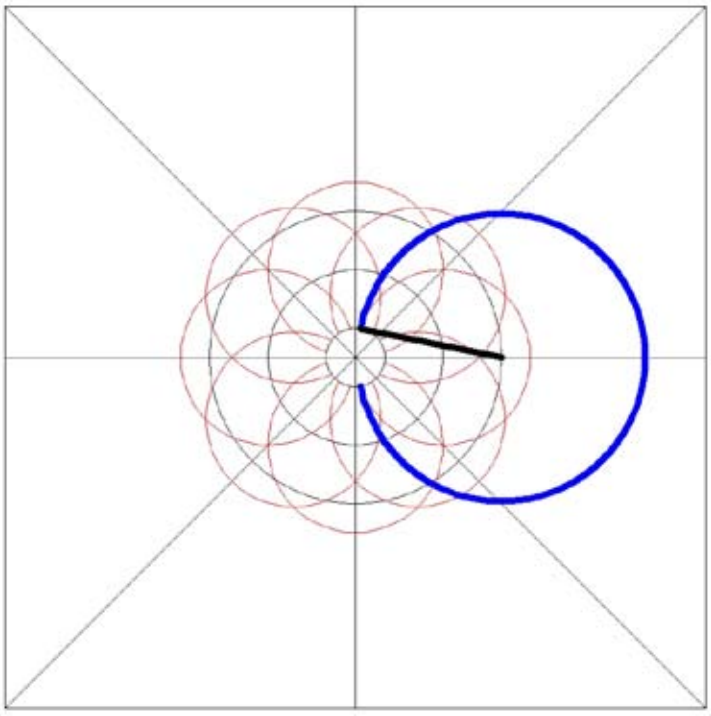
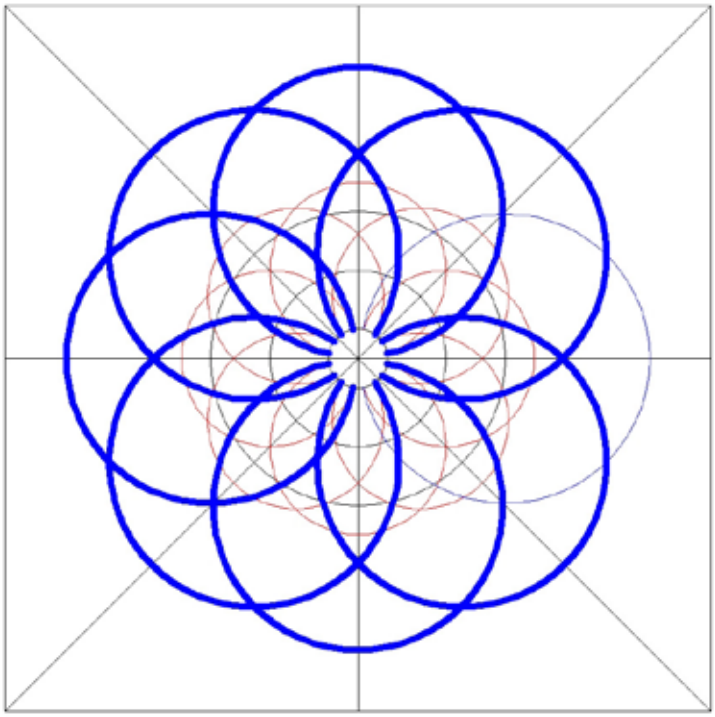
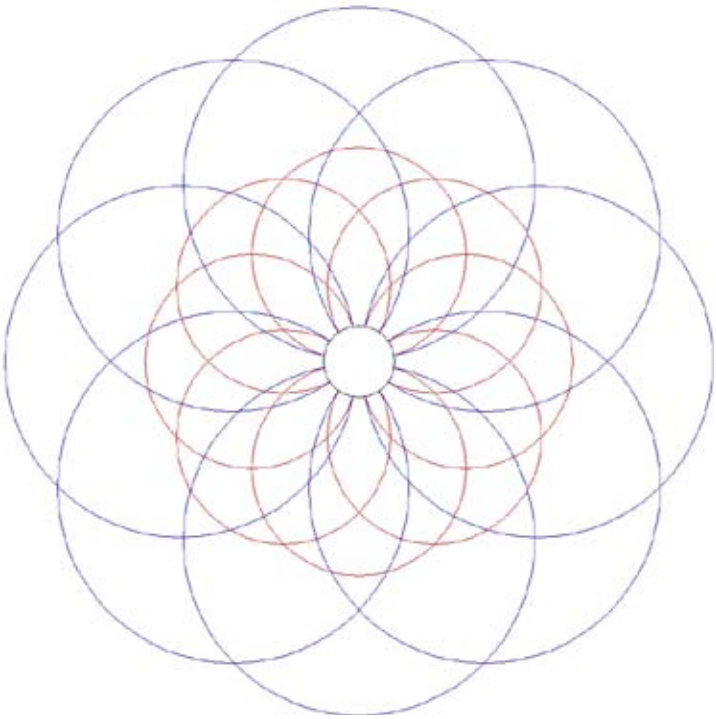


5) Using point B as the pivot, draw an arc that touches the center circle at 2 points. The endpoints of this arc should meet the endpoints of a smaller arc.

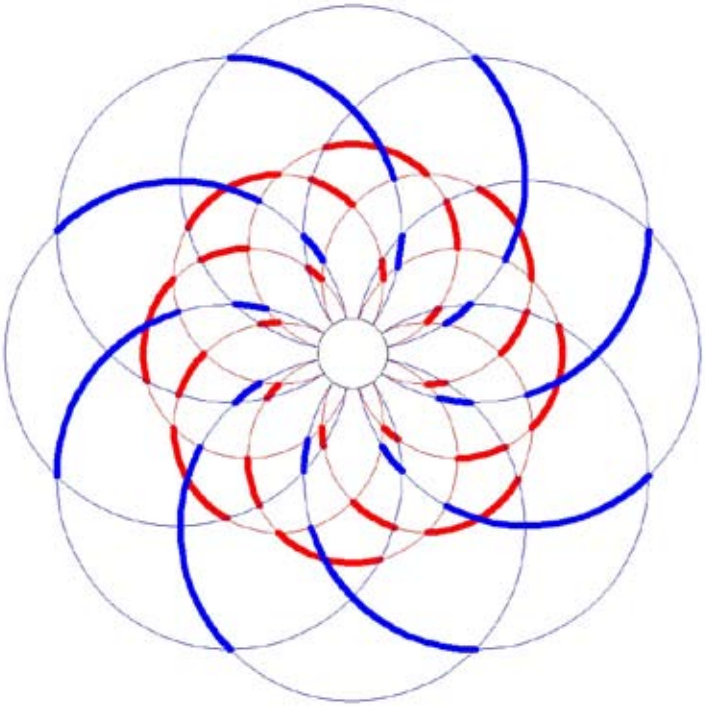


6) Continue around the 60" **diameter** circle, and draw 7 more arcs as shown above. The center of each arc should be where the crosshair lines intersect the 60" diameter circle.



7) All arcs shown, with the 2 outer circles (set-up circles that will not be cut) and crosshair marks removed for clarity.

From this point, the design could be completed in several different ways, with some imagination.



8) Erase the shaded line sections shown above, as they will not be cut. The design appears to be quite complex at this point, but there is a common pattern that becomes apparent after studying the layout.

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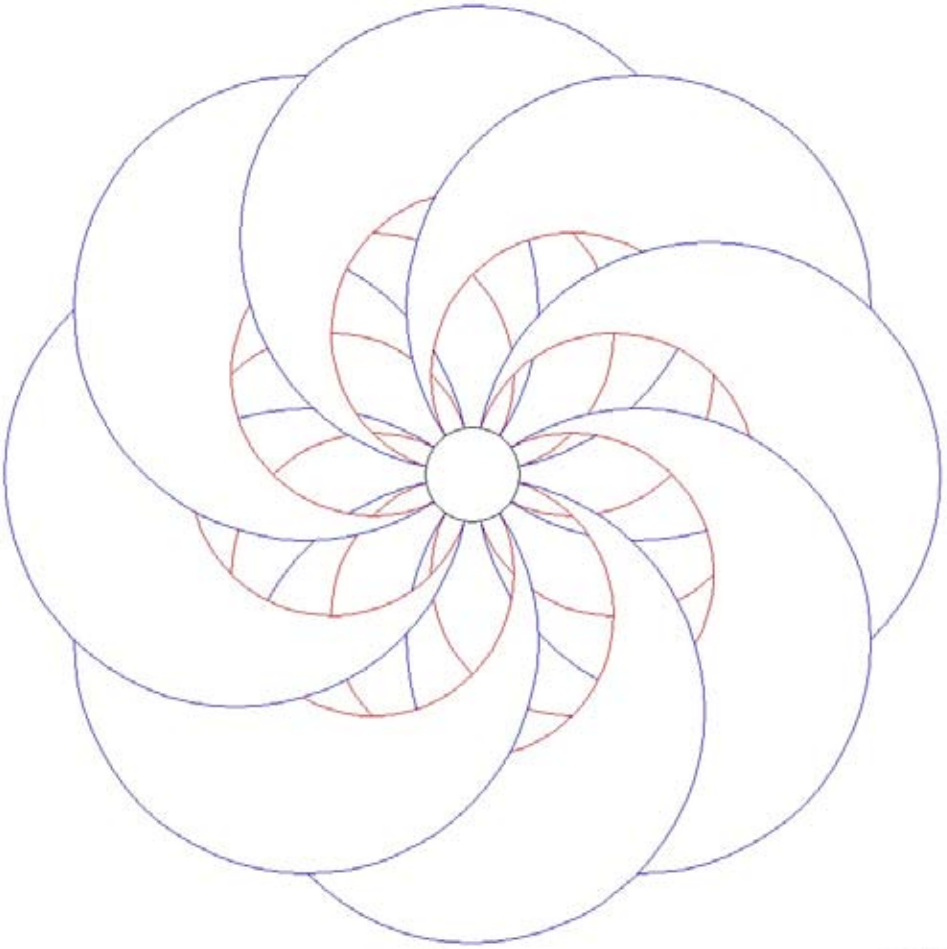


9) The image at left shows all of the lines to be cut.

Erasing the lines shown in the previous image (or covering them with tape*, bricks, et cetera) is the most important step of creating this pattern, and close attention to detail will pay off.

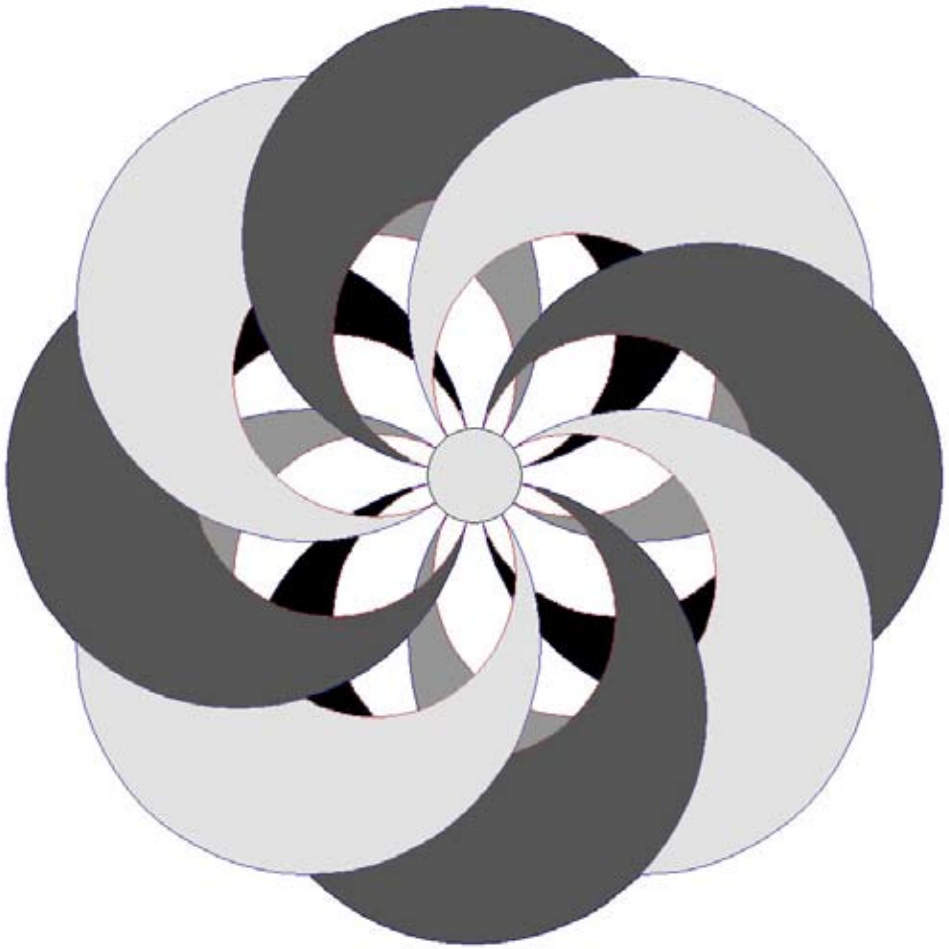
CAUTION: *Use blue painter's tape only on your concrete surface and remove it within a couple of hours. Other types of tape will adversely affect the way concrete accepts stain, leaving your concrete with permanent tape marks.

10) The finished pattern, shown with shading to represent various stain colors.

Note that the 'under-lapped' portions of the crescent shapes have been given darker colors, to mimic shadows and give the pattern some depth.

Alternate versions of this pattern could include reversing the direction of the spirals; different crescent radii; weaving the crescents over and under each other; ending the crescents before they return back to the center circle; and many other possibilities.

Stain color selection could also give many different effects to this pattern.



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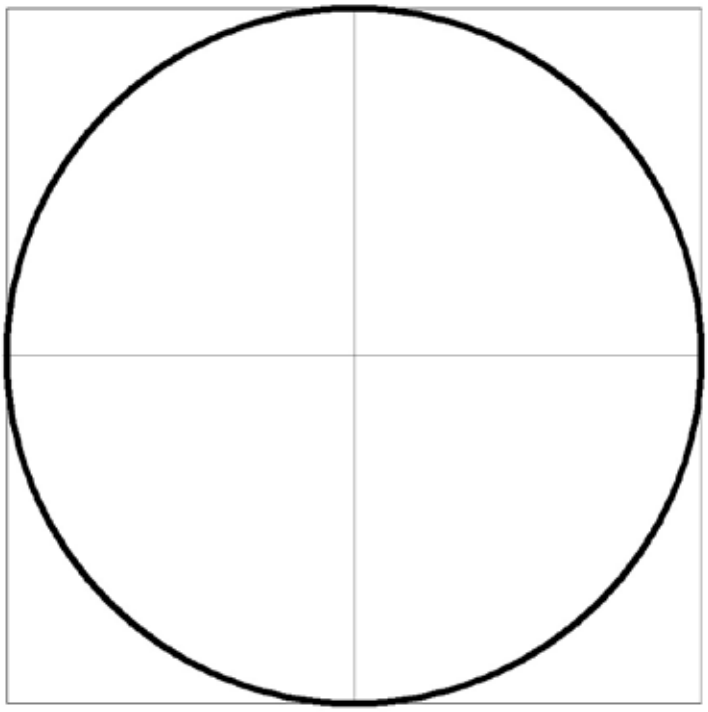
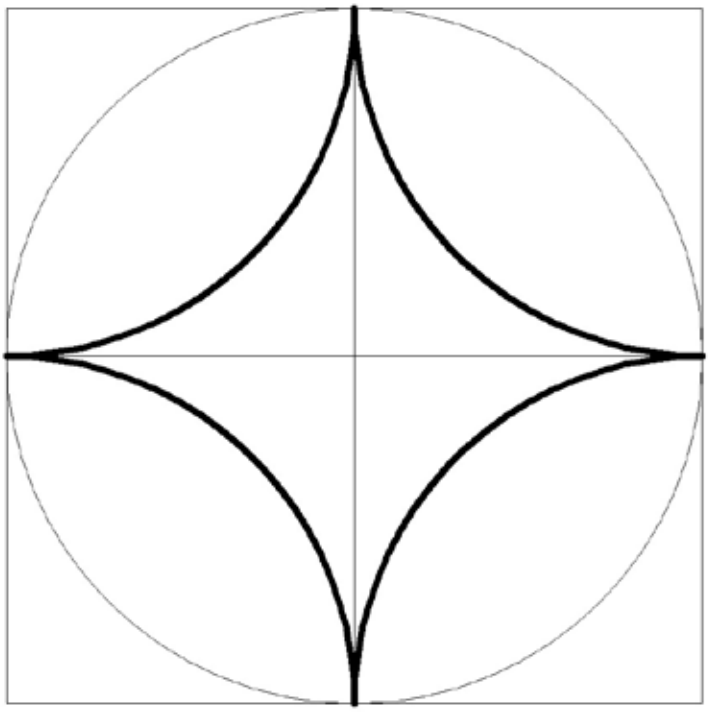
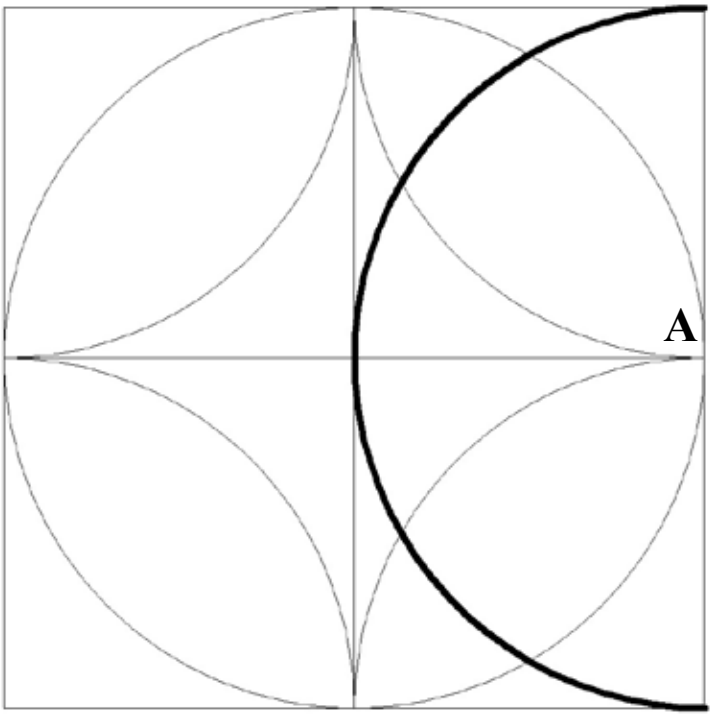
Floral Pattern 1



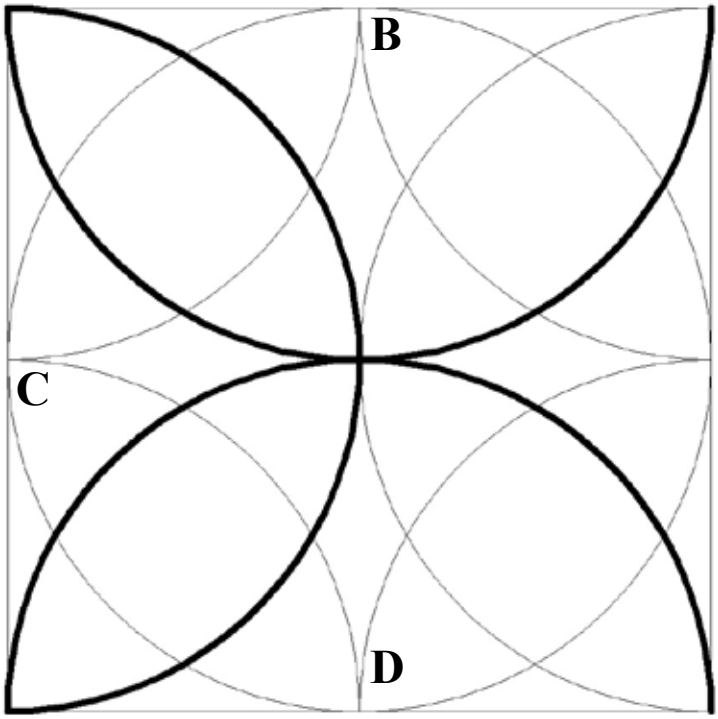
1) This pattern begins with the basic 90-degree crosshairs (to find the center of the slab). Draw a set-up circle with the same **diameter** as the narrowest width of the slab. For this example, our set-up circle is 12' in **diameter**.



2) Use the same **radius** to draw arcs at each corner of the slab (or your border) that extend from the center of one side to the center of its perpendicular side.



3) Draw a half circle with point A as the center point, using the same **radius**.



4) Repeat at points B, C, and D.

The crosshairs will no longer be used, and have been removed from this drawing for clarity.

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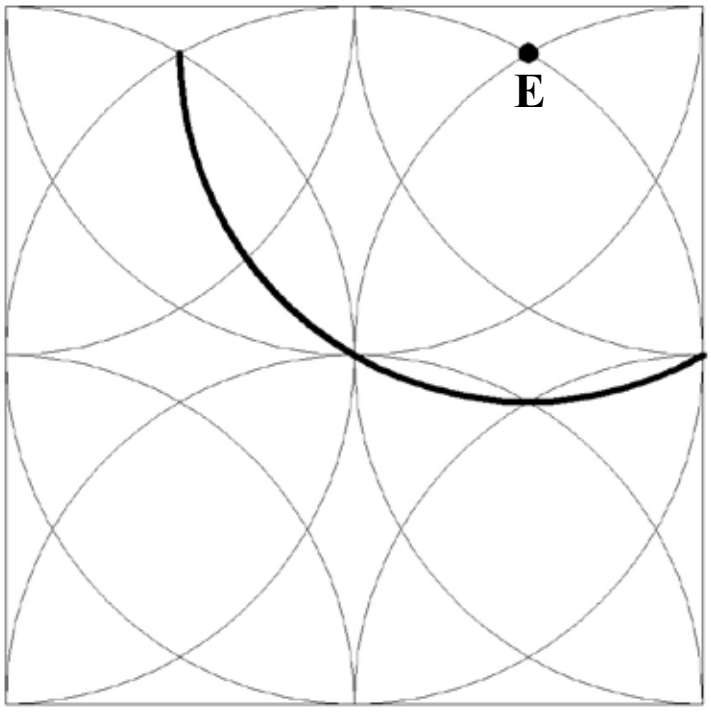
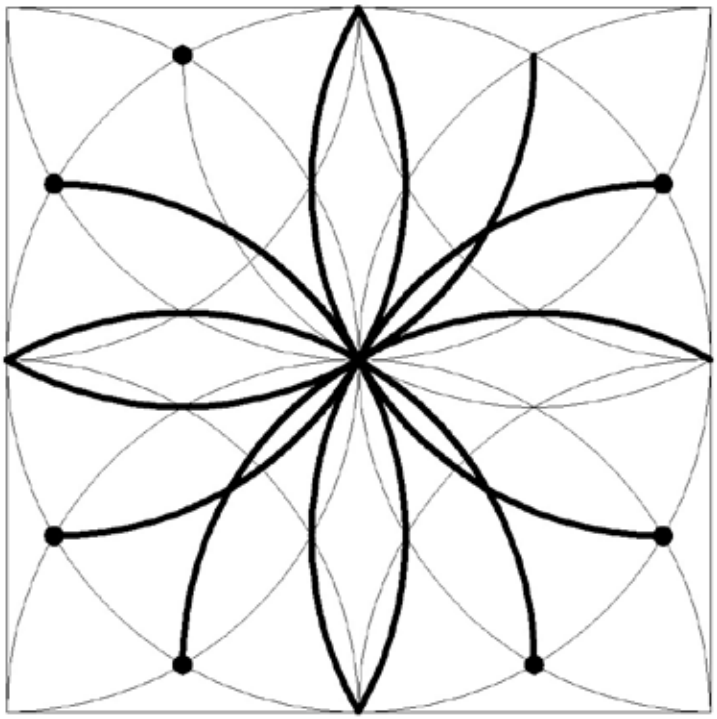
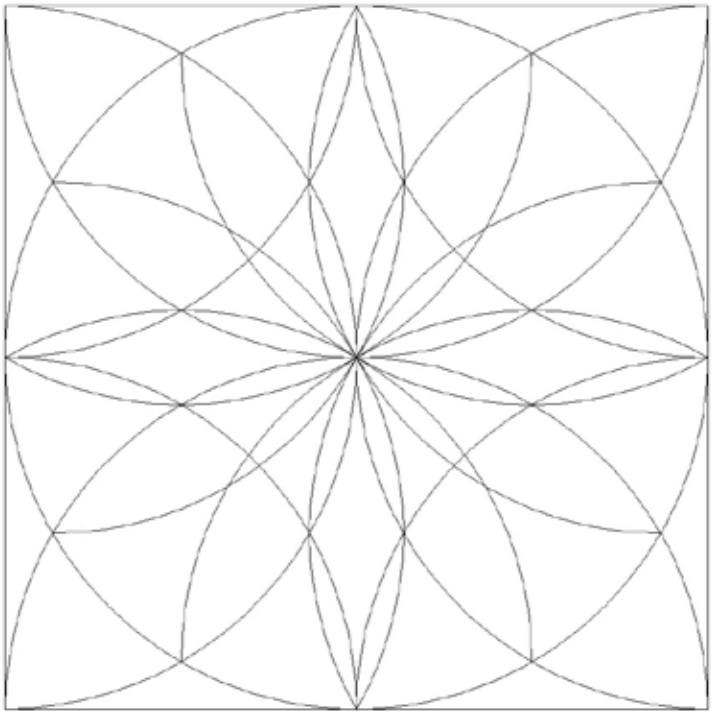


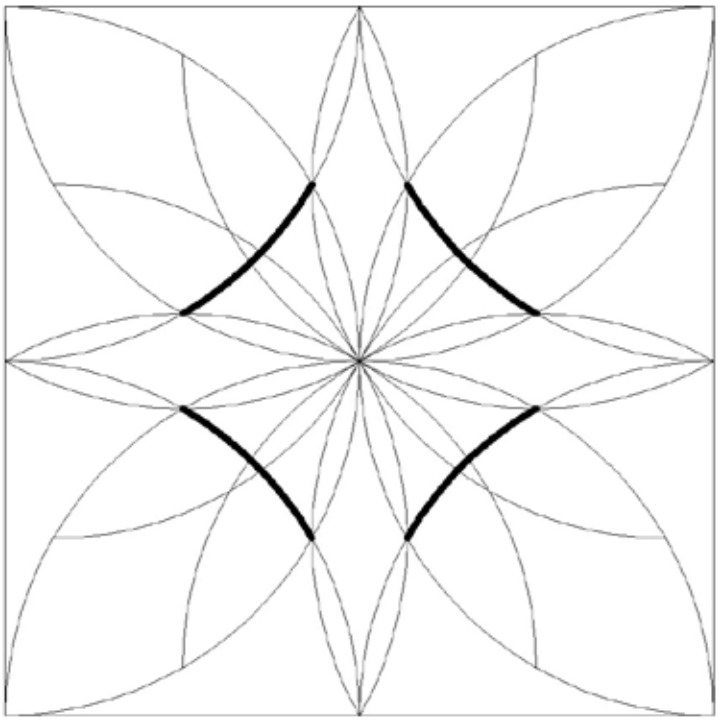
5) Keep the same **radius**. Using point E as the pivot, draw an arc that starts and ends at the main set-up circle. (This should also be where arcs intersect the



6) Continue around the set-up circle and draw arcs at each point shown above.



7) The pattern as viewed before removing unnecessary line sections.



8) Erase the shaded line sections shown above, as they will not be cut. Removing these sections makes all of the small oval sections identical.

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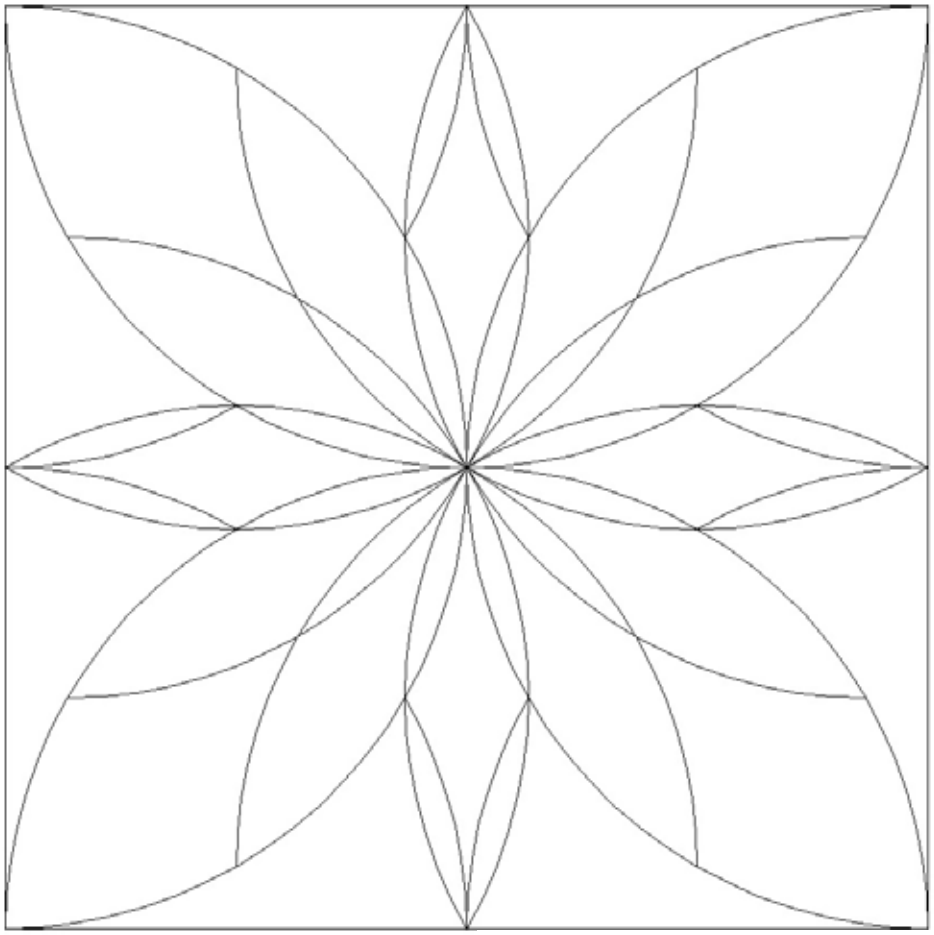
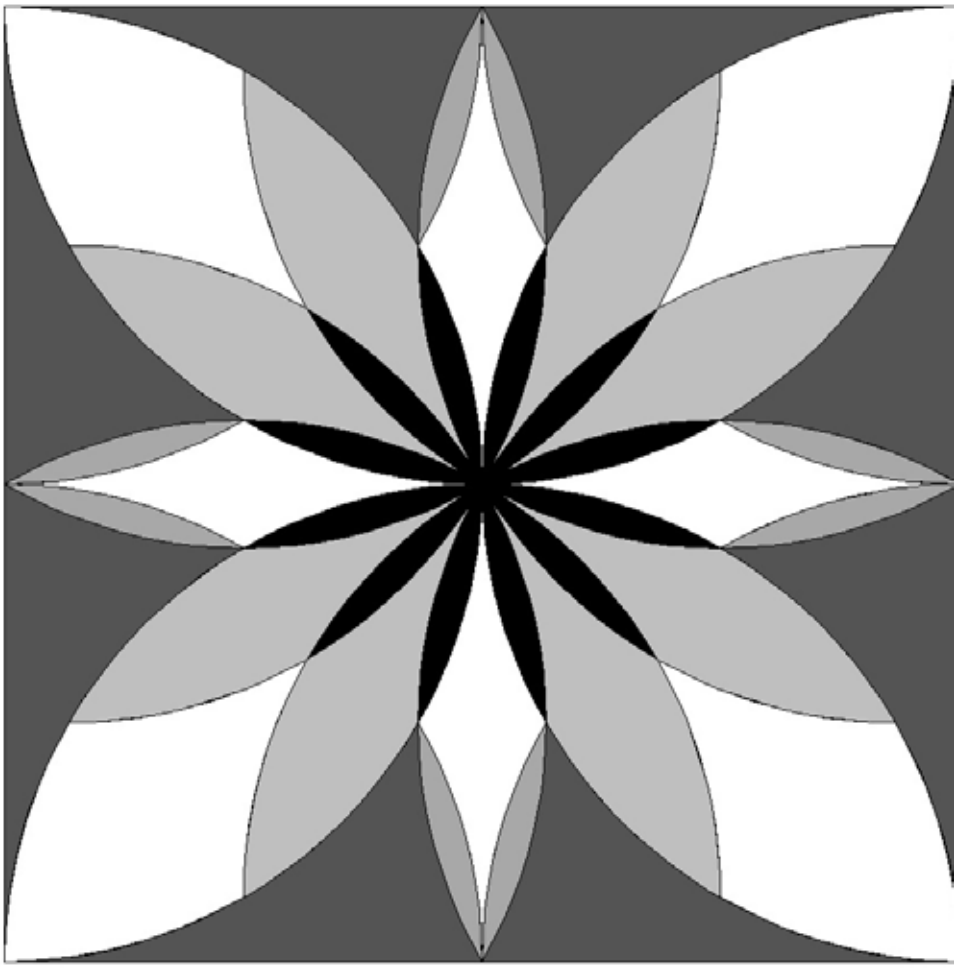


9) The pattern with all cut lines visible.



8) The pattern shown with shading to represent various stain colors.

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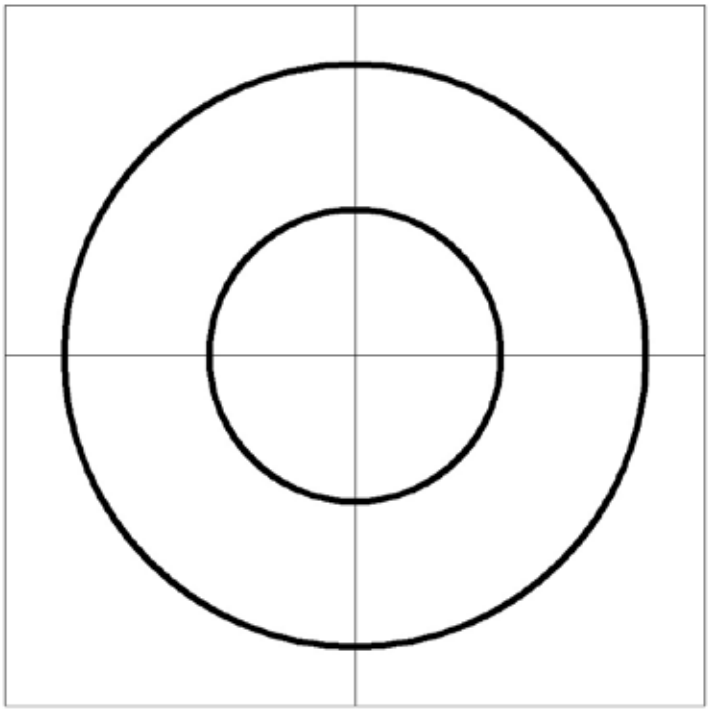
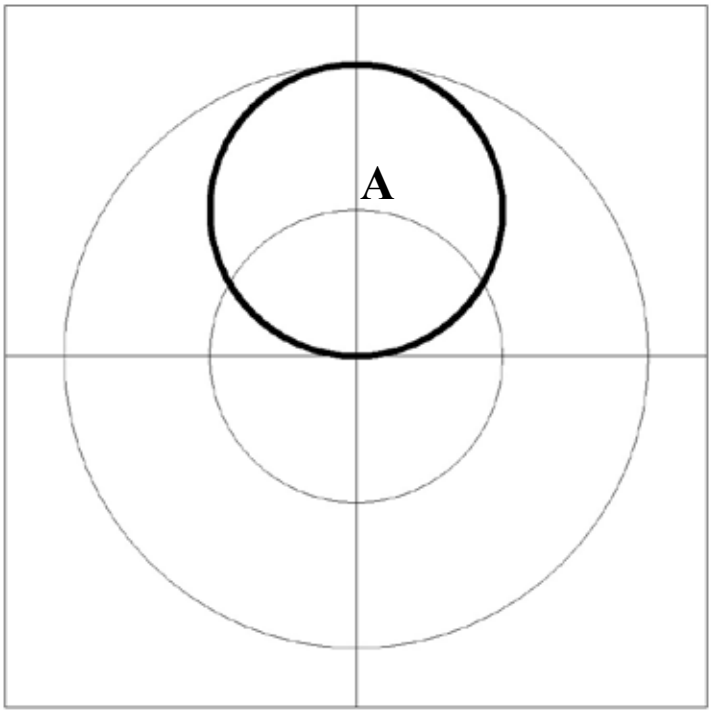
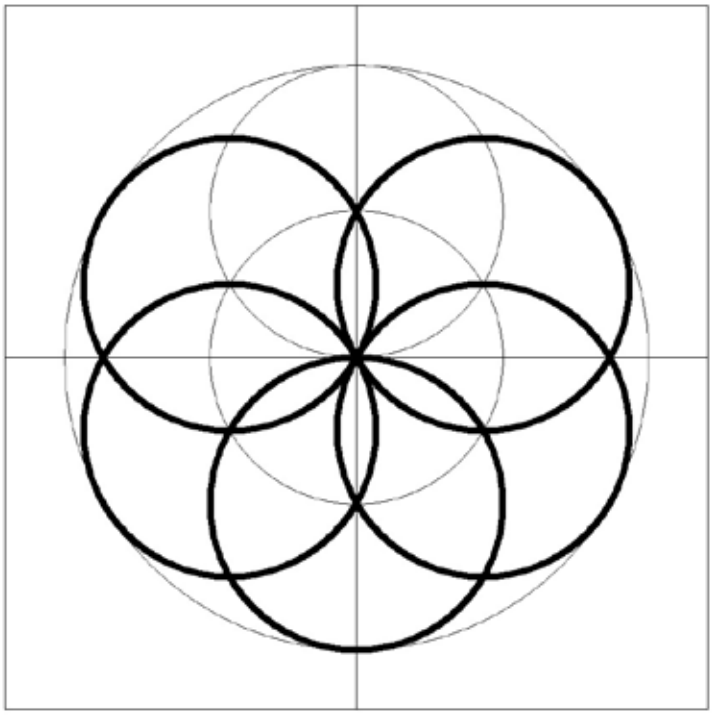
Floral Pattern 2



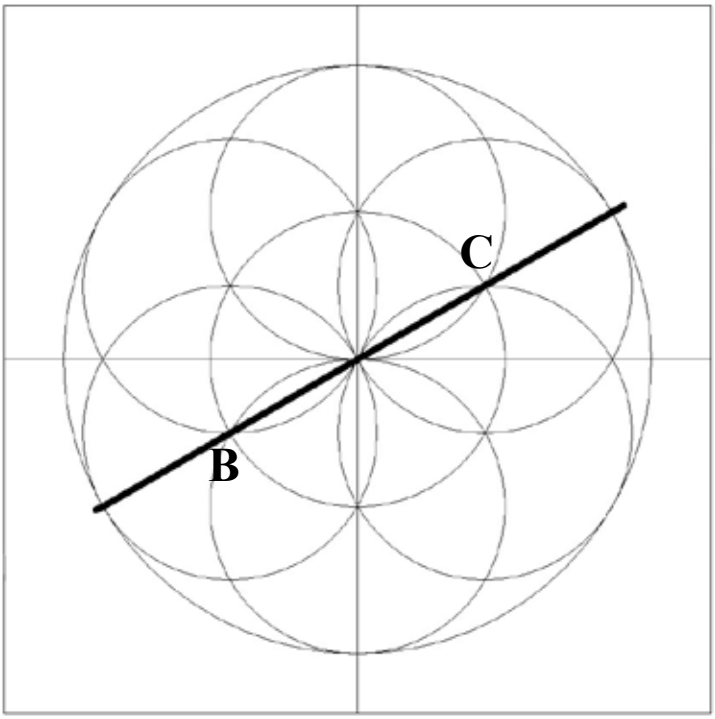
1) Start with the standard crosshairs to locate the center. In this example, the slab is 12' x 12' and we will begin with 2 set-up circles: one 60" in **diameter**, and one 120" in **diameter**.



2) Using the trammel points set at a 30" **radius**, make a full circle using point A as the center. Notice that the new circle passes through the center circle in 2 places.



3) From either of the 2 intersections created in the previous step, draw another full circle. Continue repeating this process all the way around the center set-up circle until you have made 6 new circles.



4) Create a new reference line by snapping a chalk line from point B to point C, as shown above.

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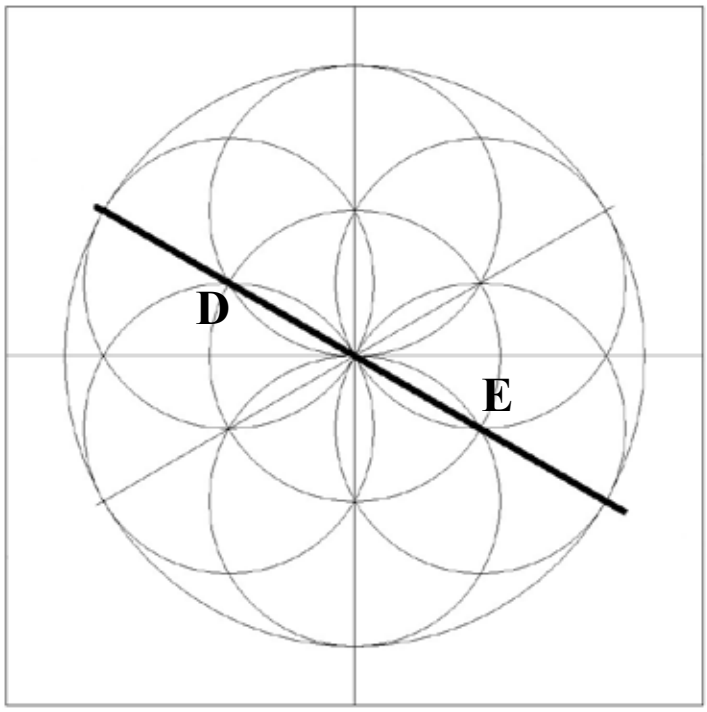
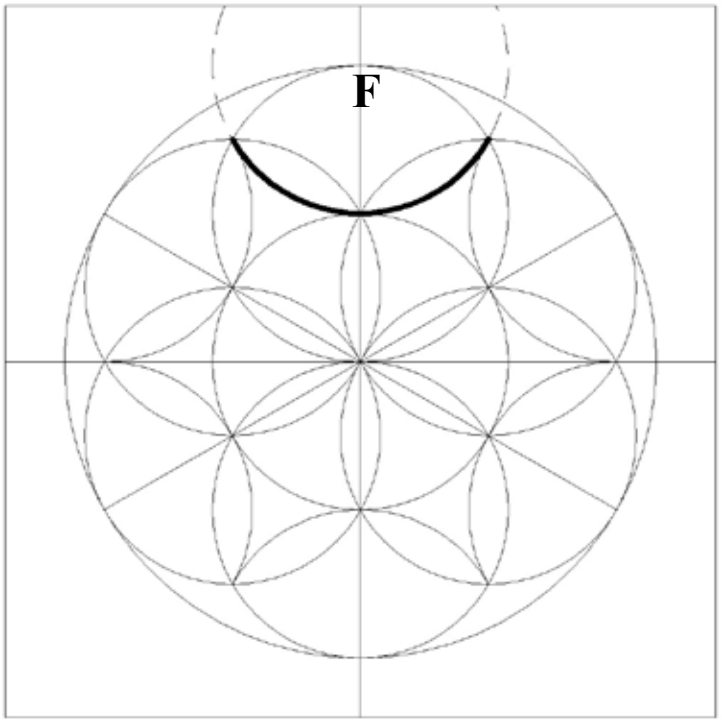
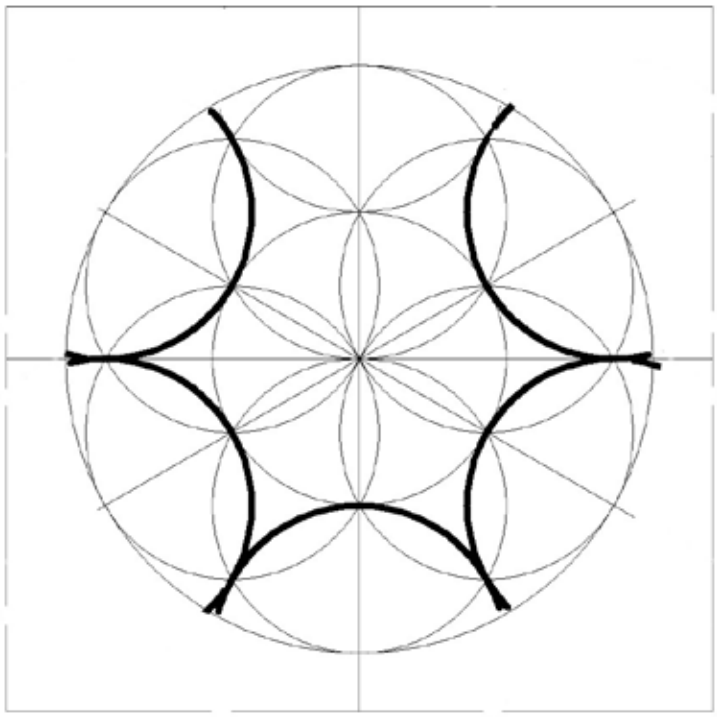


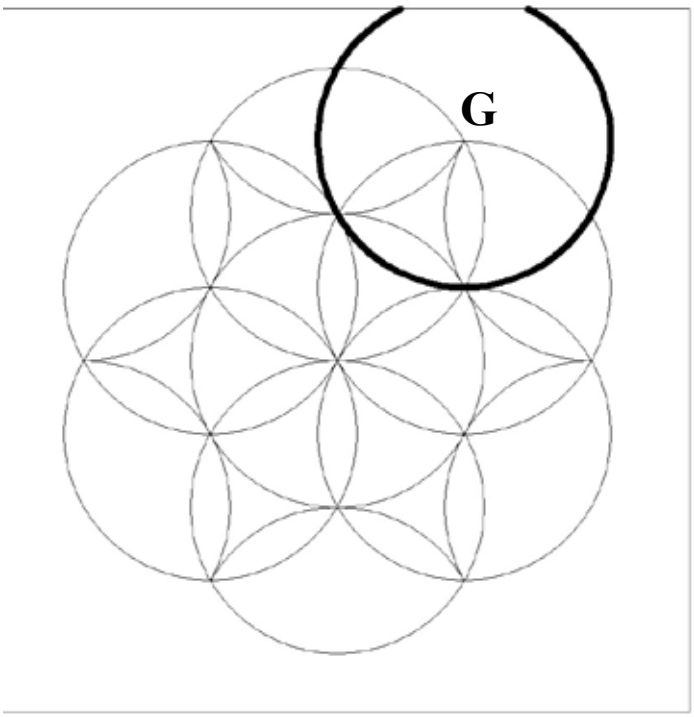
5) Repeat the previous step to create a reference line from point D to point E, as shown above.



6) From the intersection at point F, draw an arc with a 30" **radius**. Stop the arc where it intersects with the large set-up circle.



7) Continue around the larger set-up circle and make 5 more 30" **radius** arcs where the reference lines intersect with the large set-up circle.



8) Continue drawing 30" **radius** arcs from all points where 2 circles intersect (such as point G, above).

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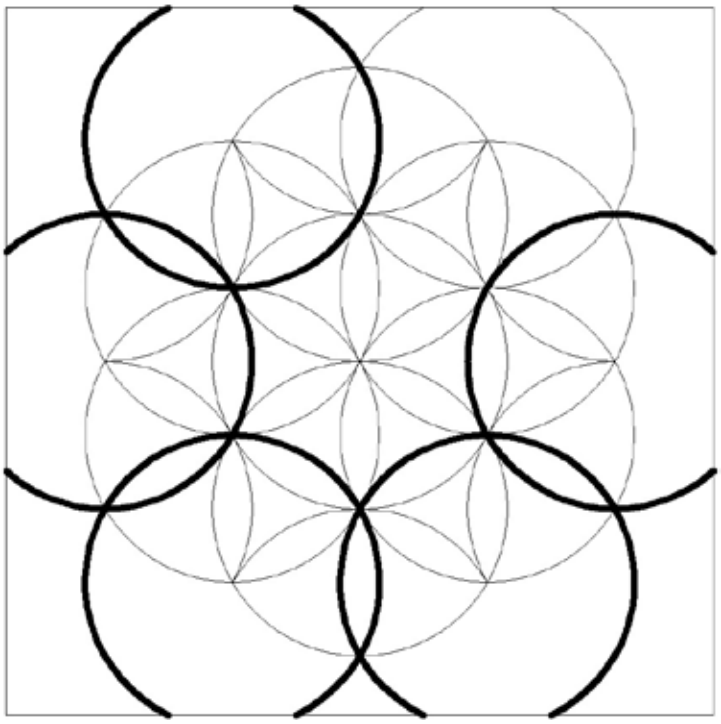
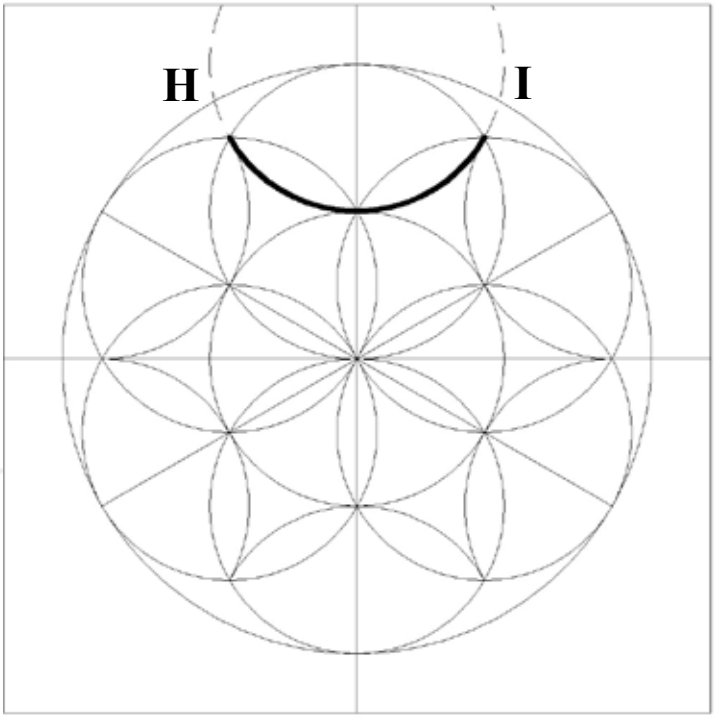
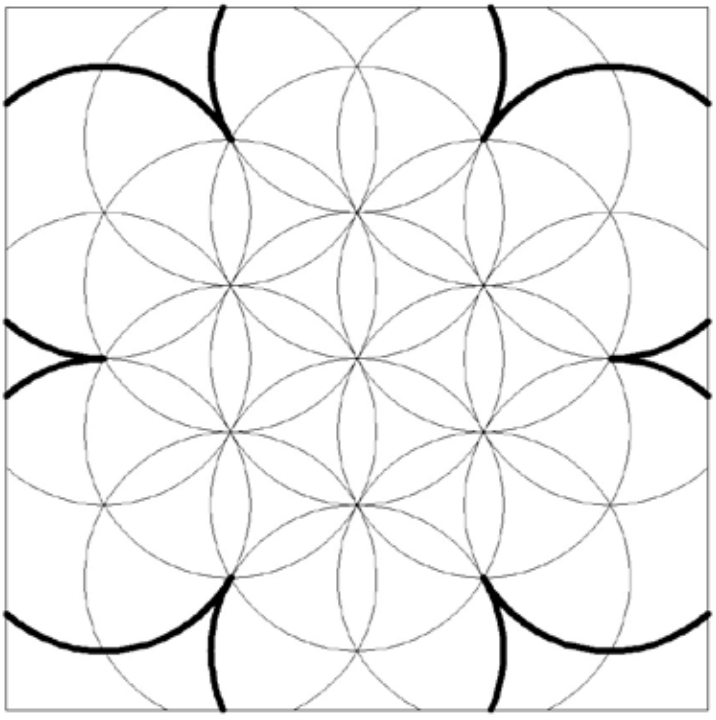


9) In the image at above/right, notice how these new circles create more leaf-shaped patterns that are identical to the others.

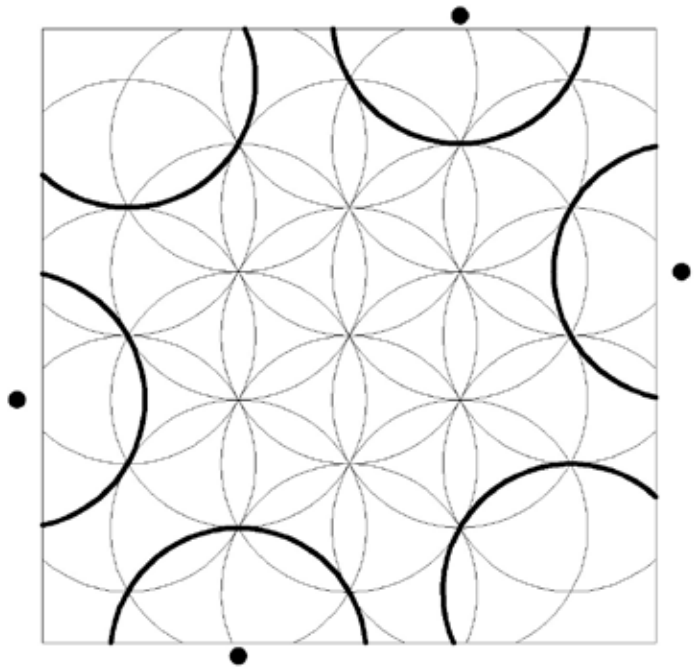


10) In step #6, we stopped the arc where it met the outer circle (points H and I). If you wish to expand the pattern farther outward, you may extend the arc to the edge of the slab (as represented by the dashed lines).



11) Extend the other 5 complimentary arcs as well.

You may opt to expand the pattern outwards, as long as there is sufficient room to place the center pivot and draw an arc without interference from walls, et cetera.



12) As illustrated above, the creation of new arcs (using the center pivot) will eventually become impossible, due to wall and/or the edge of the slab.

You may either end the pattern here, or use templates to continue the pattern outward.

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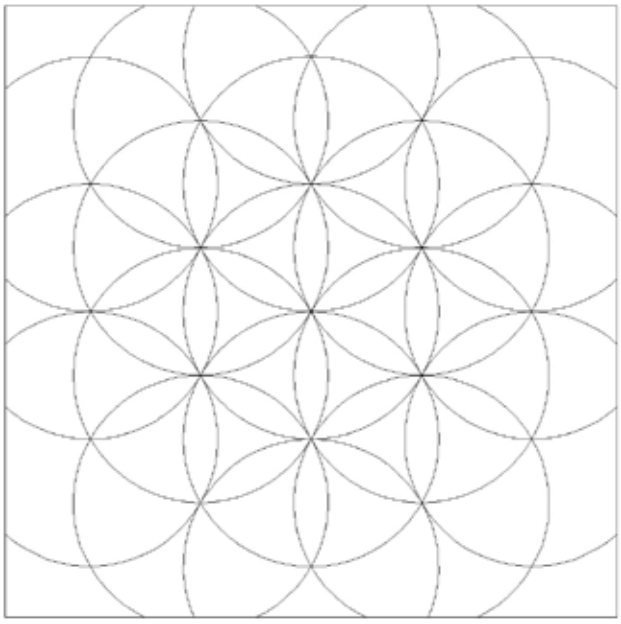
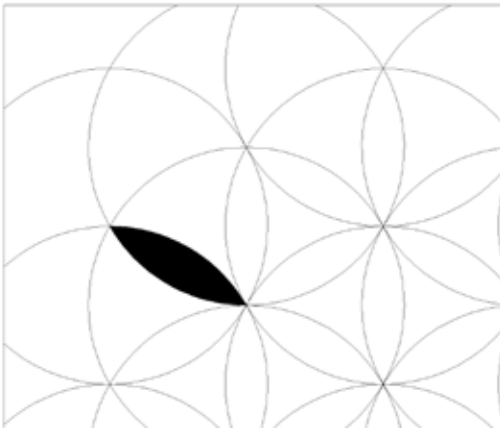


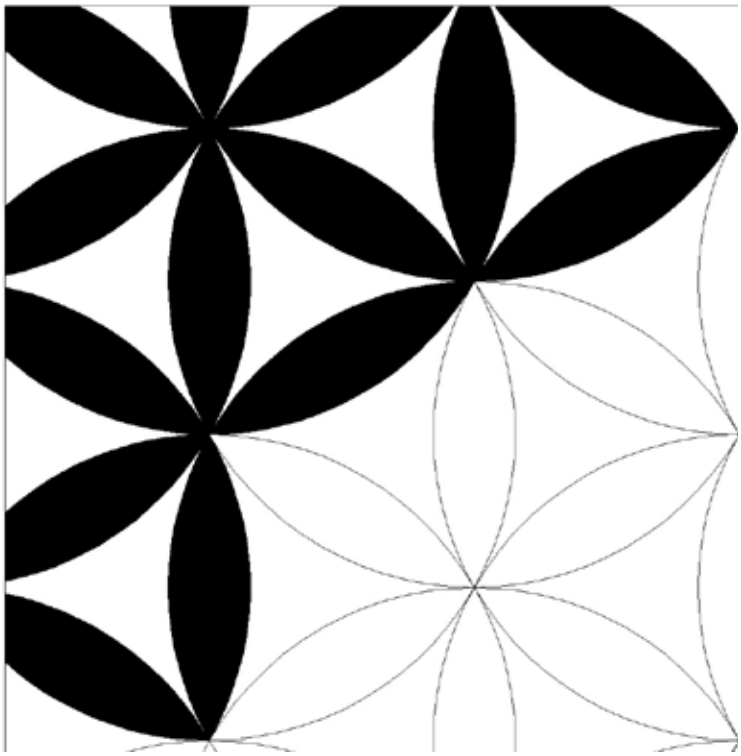
13) This image shows all arcs that can be created using the center pivot on our 12' x 12' example slab. As you can see, the floral pattern ends after 4 iterations (steps #2 through #11). Outside of this, the pattern stops repeating and other geometric shapes remain.

You may choose to leave the pattern as shown at left, or complete the floral pattern by using templates.



14) Create several templates of the shape shown at left, using cardboard or other similar material. Use the center pivot to draw accurate arcs, or cut the full pattern (as shown in image 13) and carefully cut the shape out by following the cut lines in the concrete.

If you choose the latter option, you will want to cut towards the inside of the cut lines, rather than the outside of the cut lines. In other words, you want to make a smaller leaf shape, not a larger one. This will allow your tool (like our free-form cutting ***Spiider***) to follow the outside edge of the template, keeping all leaf shapes the exact same size.



15) Place the templates at each area highlighted in black, as shown at left. Use a full template to mark all full arcs before cutting templates to fit the edges for marking shorter arcs. For clarity, only the top/left corner of the slab has been shown here.

Including the full template, there are 6 different shapes that will need to be repeated. The templates you create can be flipped over and used to create mirror images of the same shapes.

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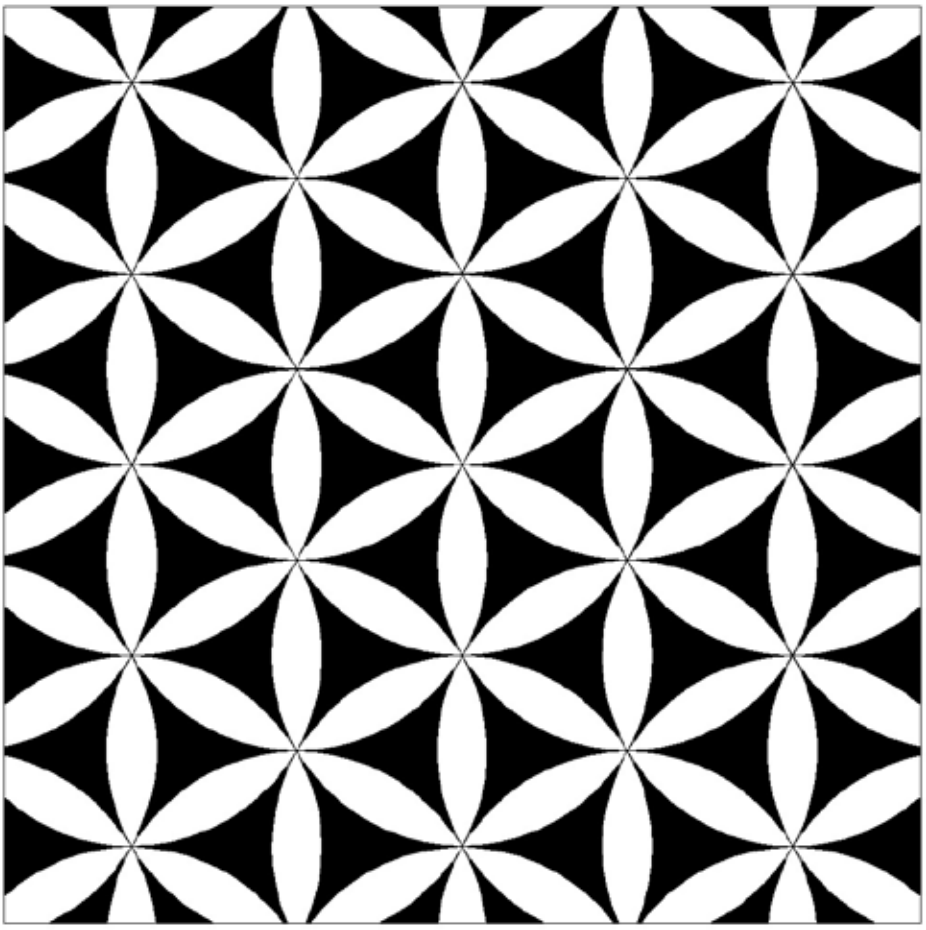
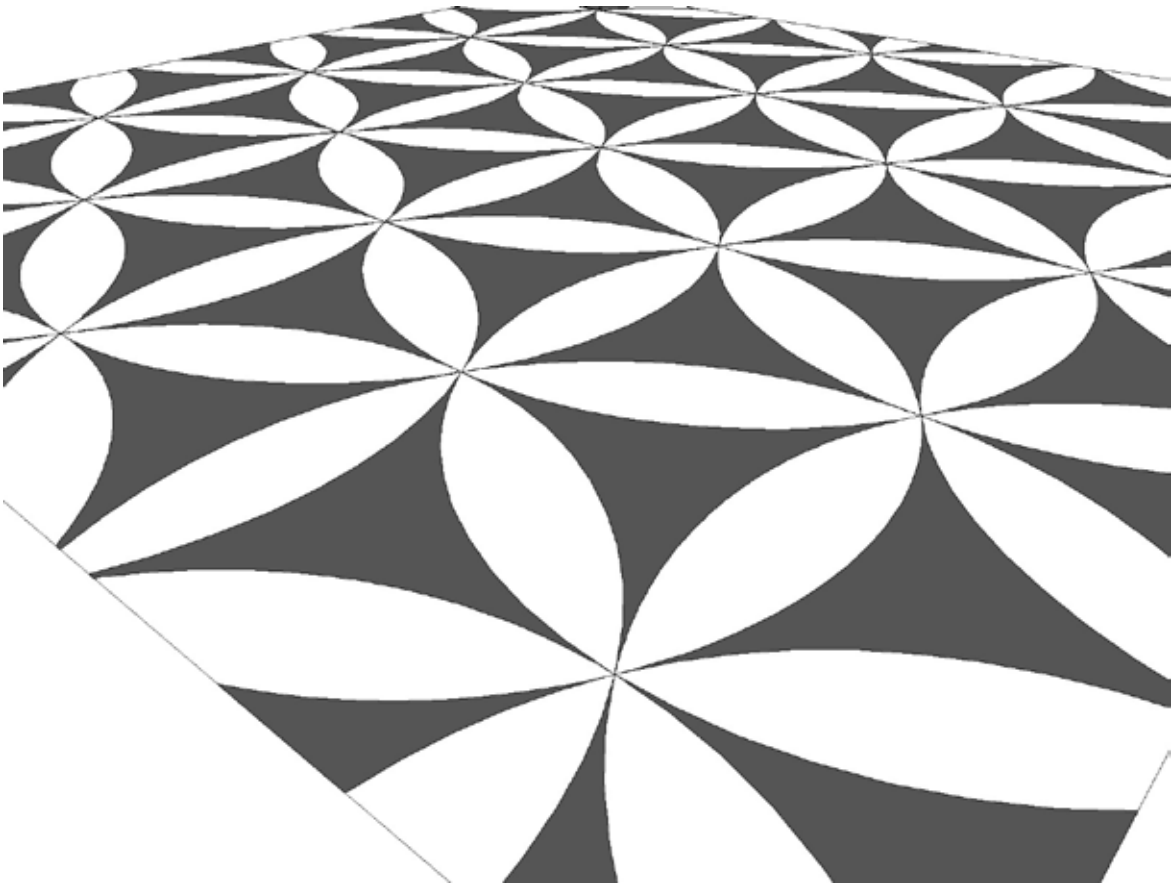
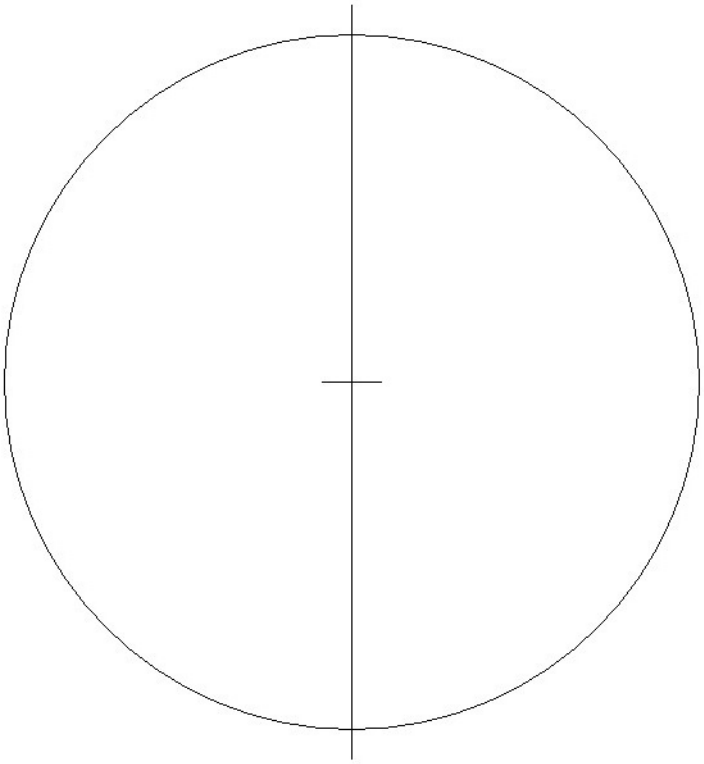


16) The completed floral pattern, with the 'background' shaded.

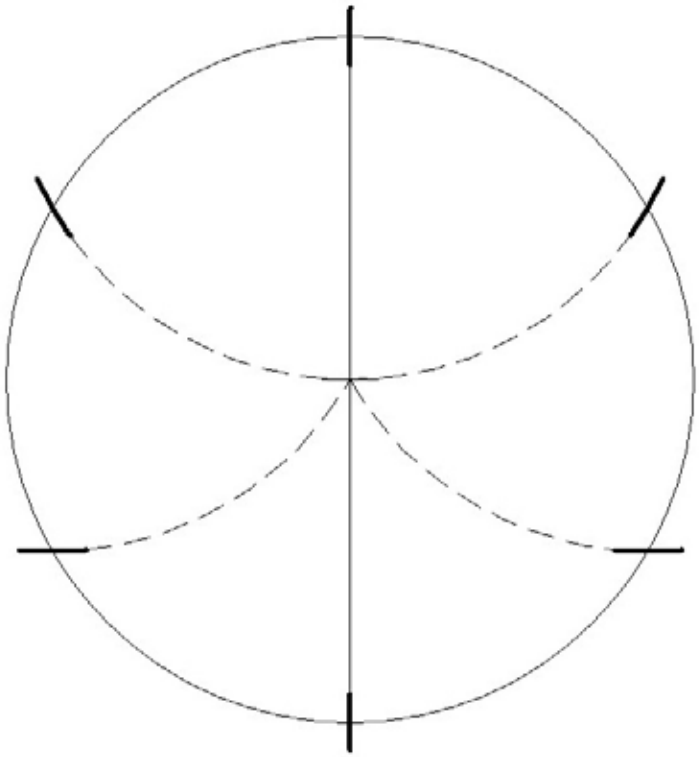


17) Sample image of the same pattern, with 45 degrees of perspective.

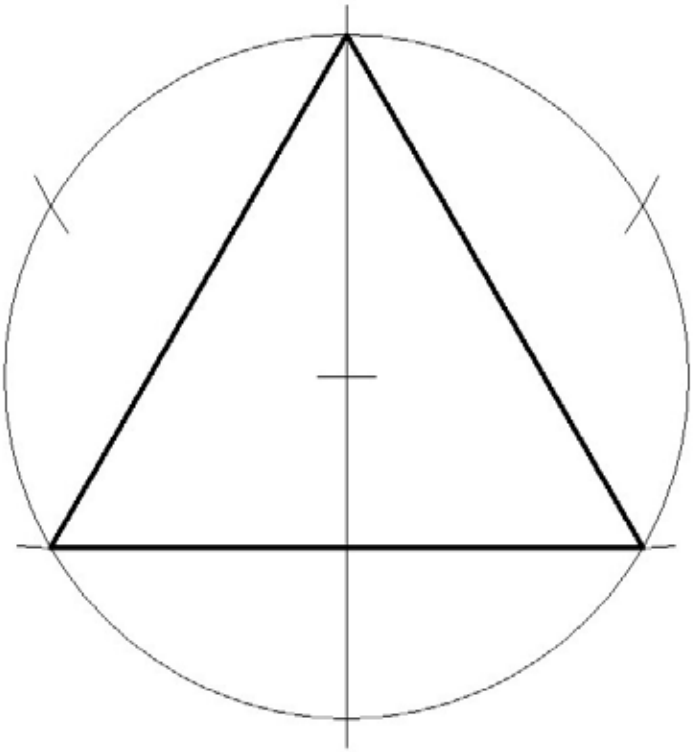
Church Window



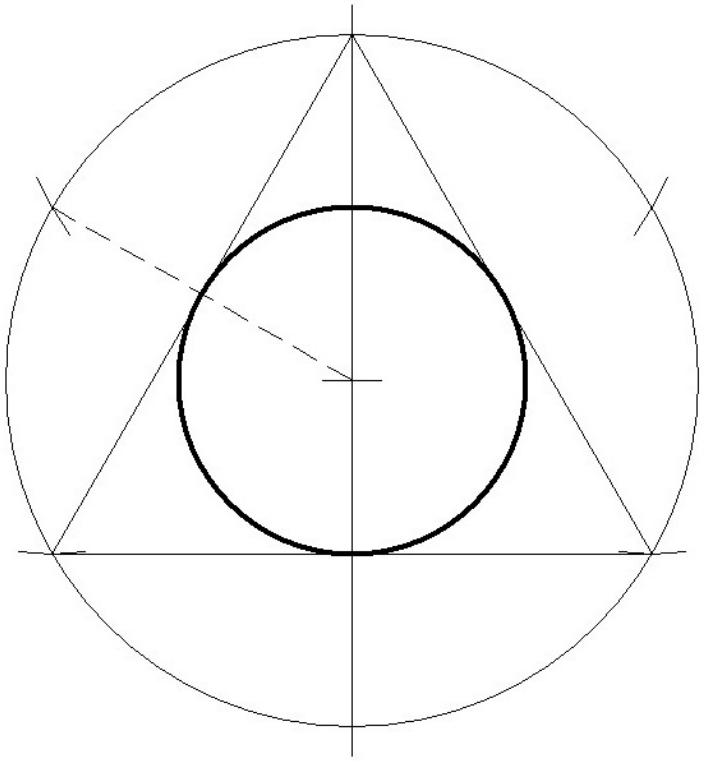
1) Begin by placing a center-line down the middle of the slab, and making a center mark (crosshair) at the center of the line. From the crosshair, draw a full circle. This will be the full size of the finished pattern.



2) Divide the circle into 6 sections using trammel points set at the same radius as the circle (see Easy Hexagon section of this guide).



3) Draw a triangle from the points shown above.



4) Draw a layout circle in the center of the triangle. The diameter of this circle should bisect the middle of one leg of the triangle, as represented by the dashed line above. (It is also exactly half the diameter of the larger circle.)

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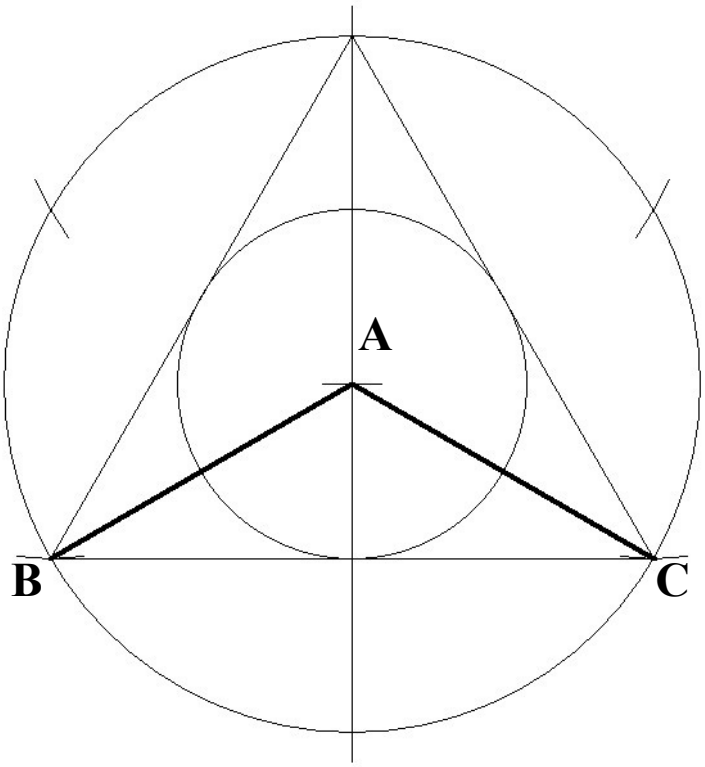
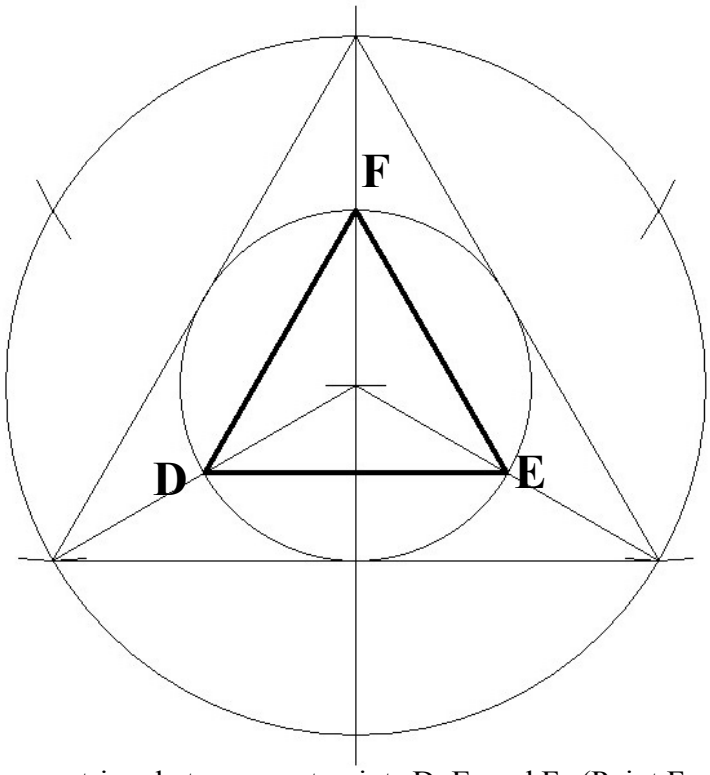
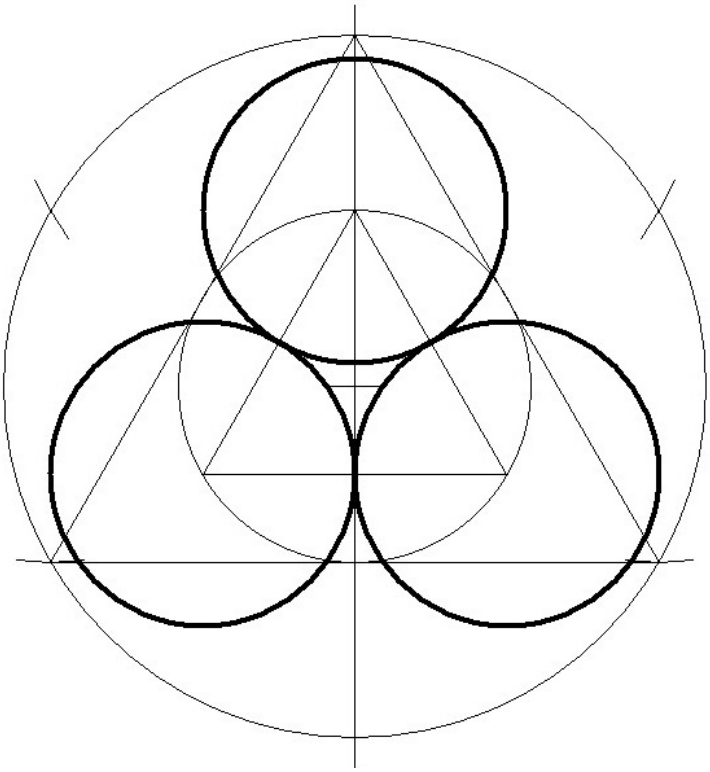


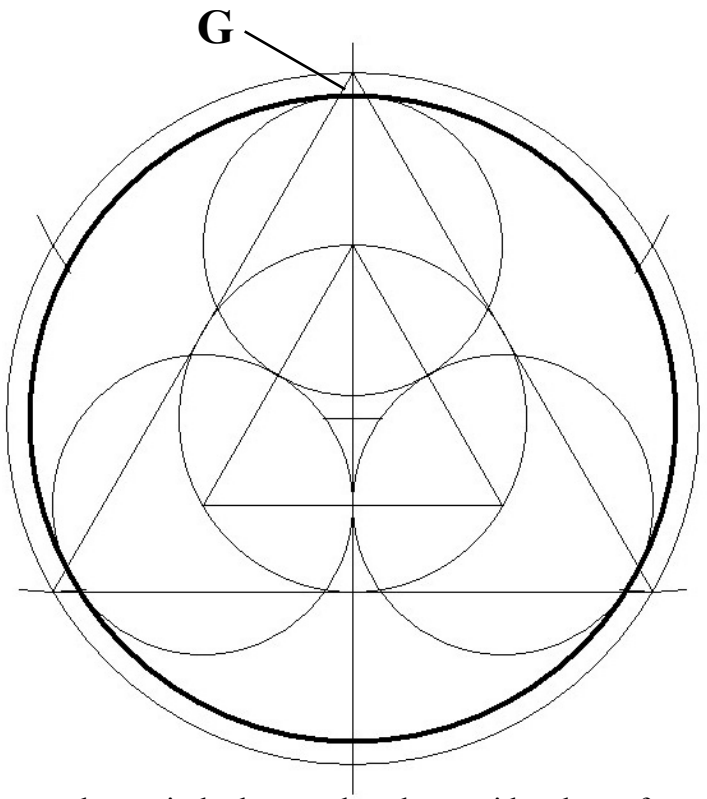
5) Draw a line from point A to point B, and then another line from point A to point C. This sets up the next triangle. (These lines will not be shown in some of the following diagrams.)



6) Draw a triangle to connect points D, E, and F. (Point F was created in step 4.) This triangle will be referred to as the Reference Triangle.



7) From each corner of the small triangle, draw a circle that bisects each side of the same triangle. All 3 circles will touch.



8) Draw a large circle that touches the outside edges of the 3 smaller circles. Use the center point and point G (on the center-line) to find the correct radius.

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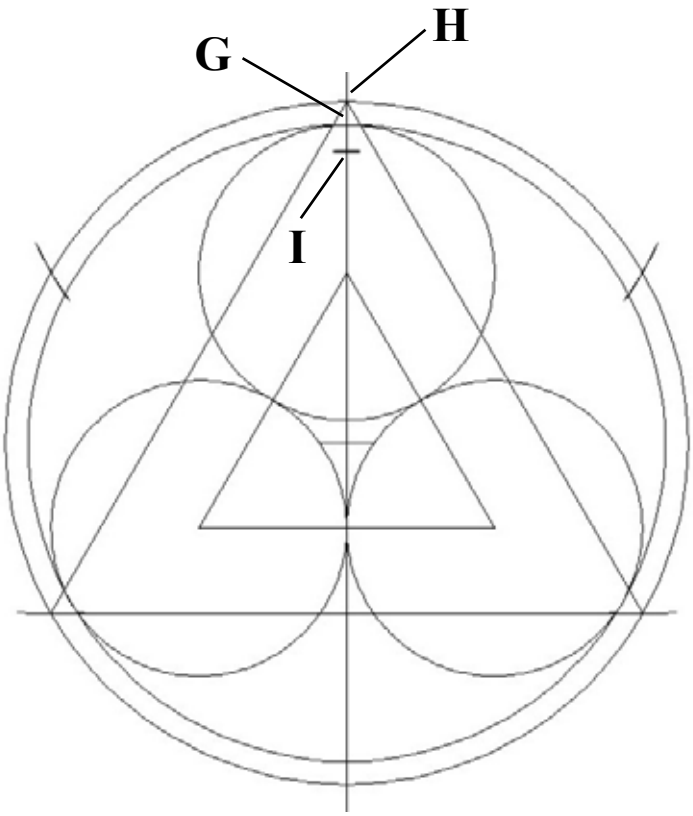
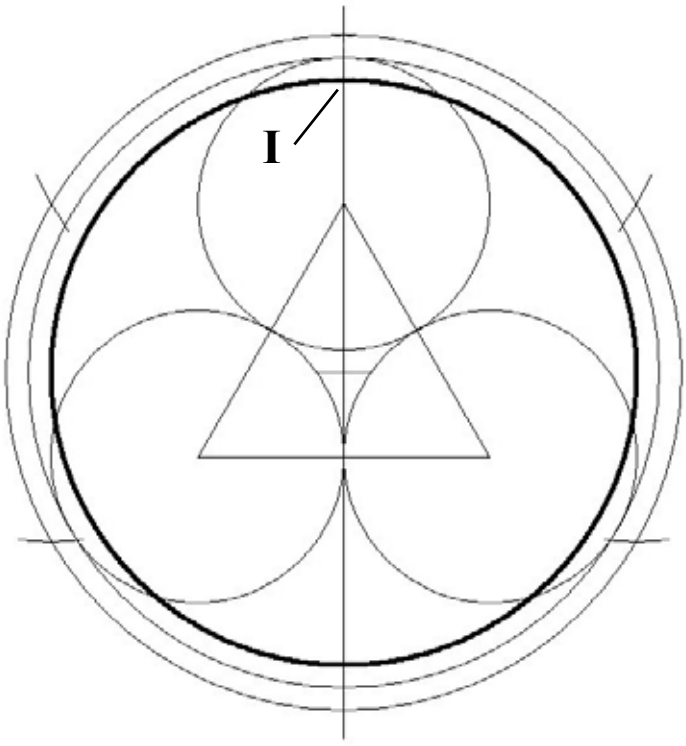
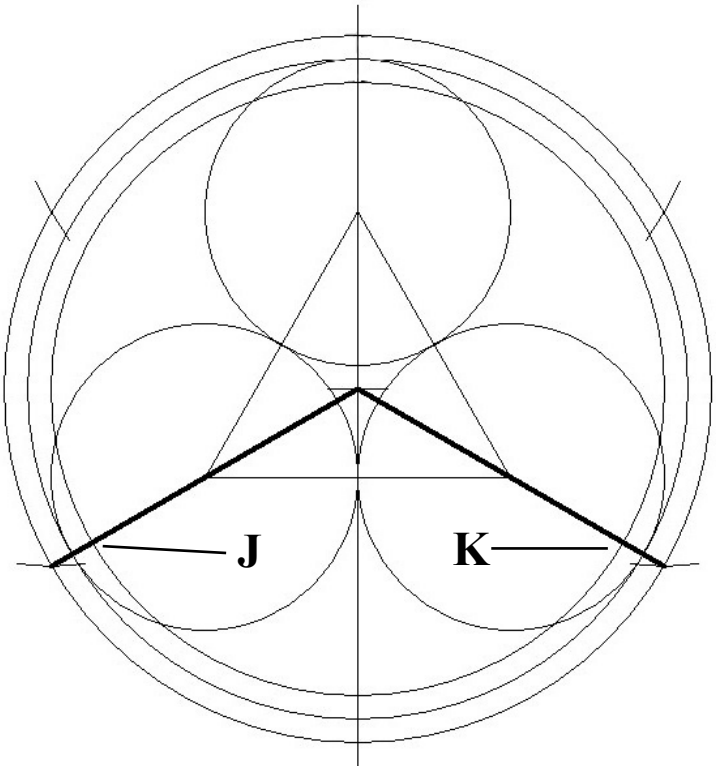


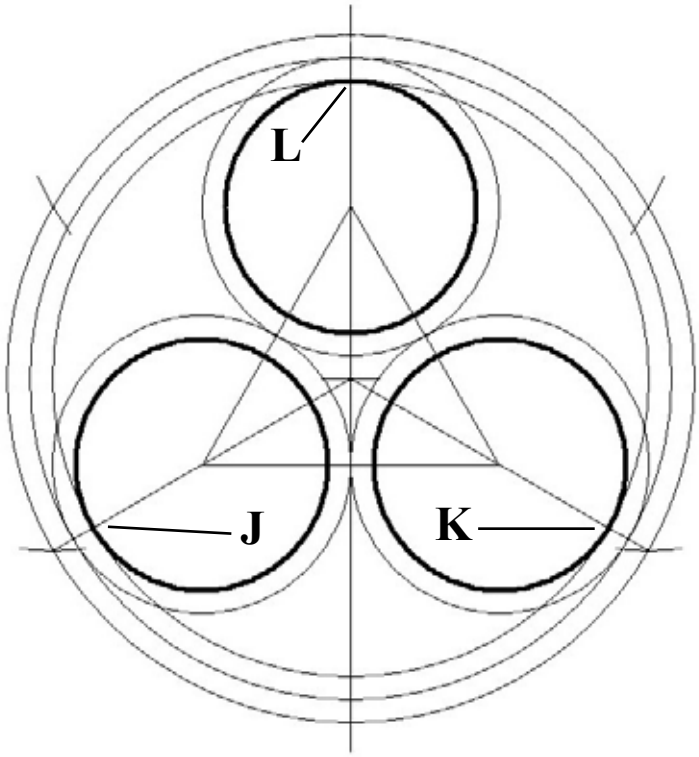
9) Measure from point G up to point H. Then, measure down the center-line from point G the same distance and place a mark to create point I.



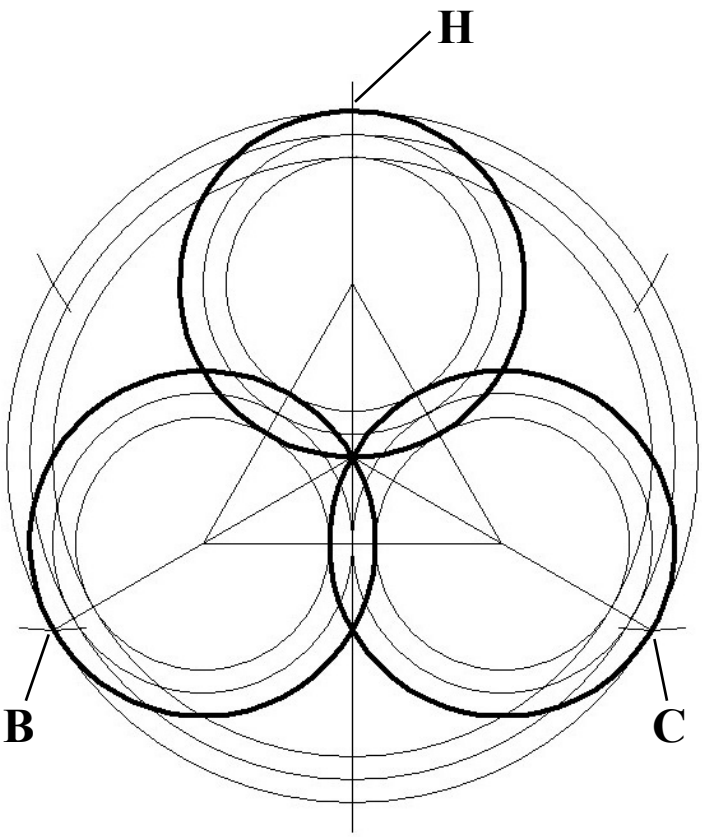
10) Erase the large set-up triangle created in **Step 3**, and the set-up circle created in **Step 4**. Draw a large circle using the center point to point I as the radius.



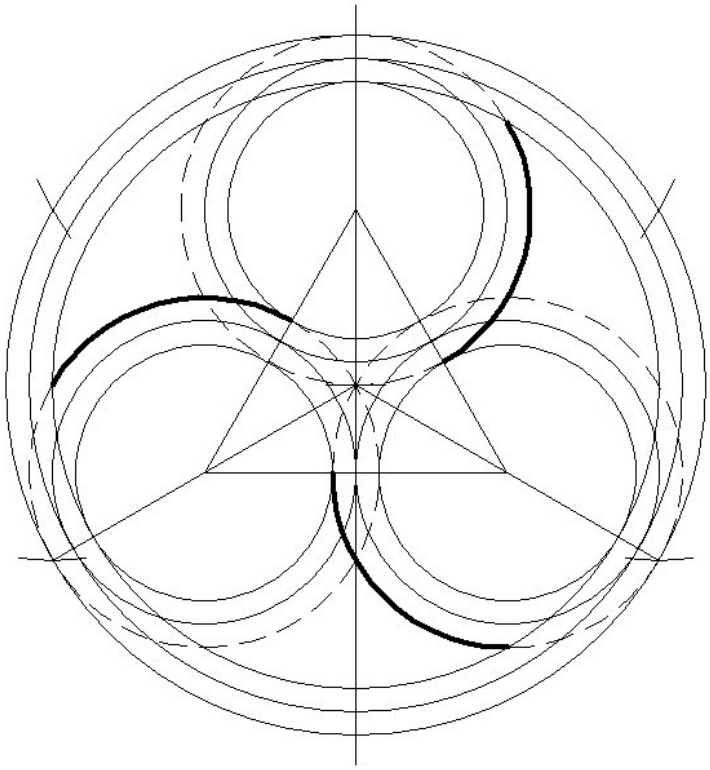
11) The reference lines made in step 5 are highlighted above. These lines create points J and K where they intersect with the main inner circle created in **Step 10.**



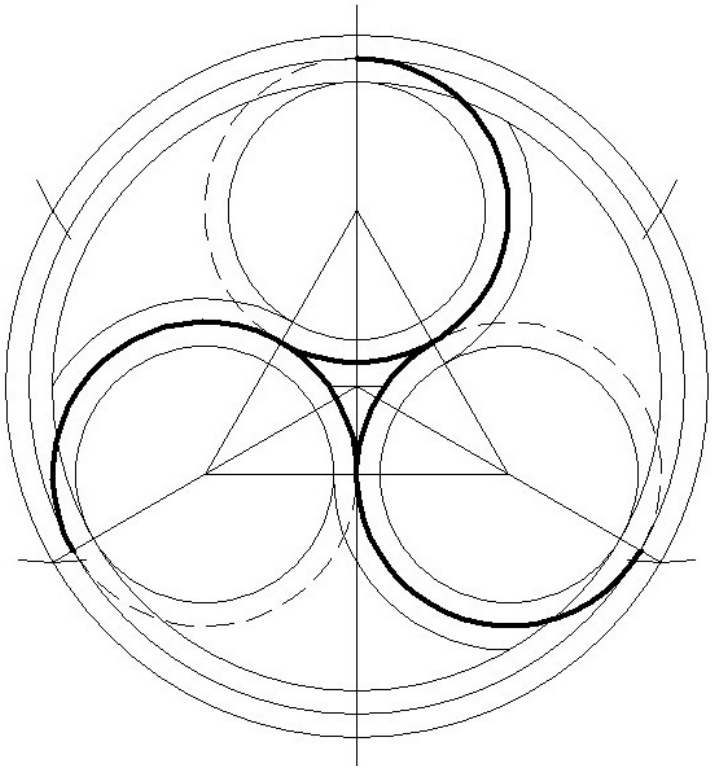
12) From all 3 points of the reference triangle, draw a circle that meets the main inner circle at points J, K, and L.



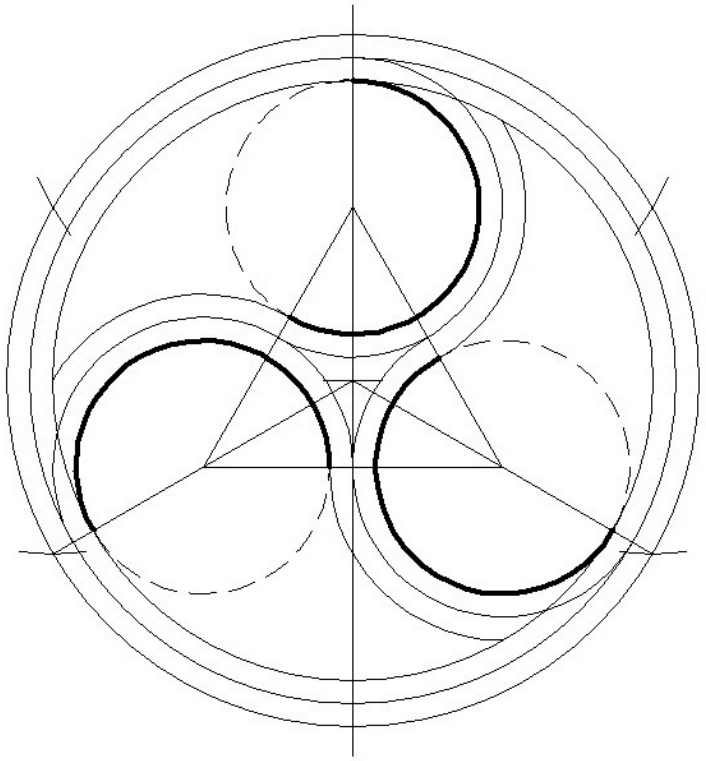
13) Also from each point of the reference triangle, draw 3 more circles that meet the main outer circle at points B, C, and H.



14) Erase the dashed arc segments of the outer group of cicles, as show above, leaving only the highlighted segments remaining. Use the reference triangle and the main inner circle as start/stop points.



15) Erase the dashed arc segments of the center group of circles, as shown above, leaving only the highlighted segments.



16) Erase the dashed arc segments of the inner group of circles, as shown above, leaving only the highlighted segments.

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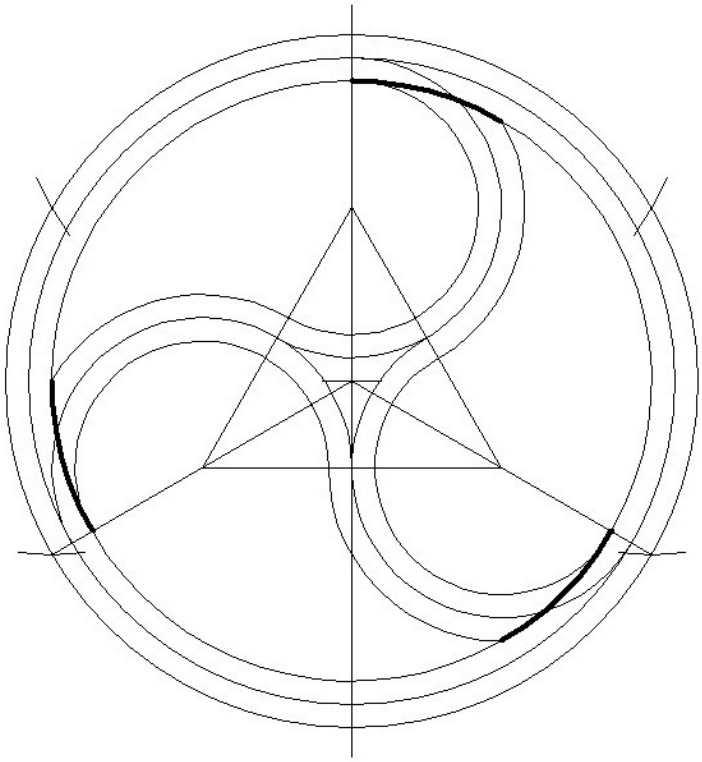
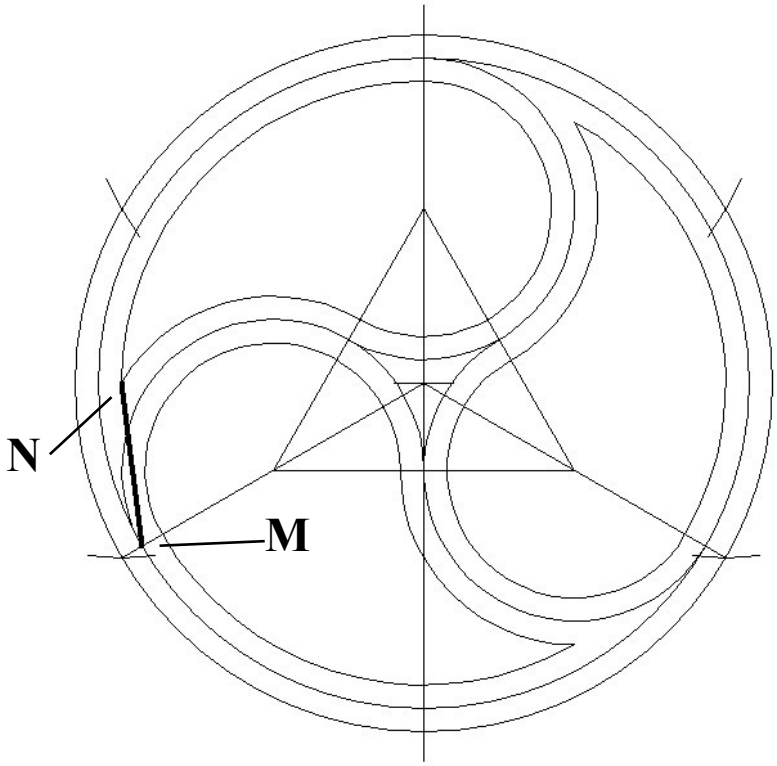
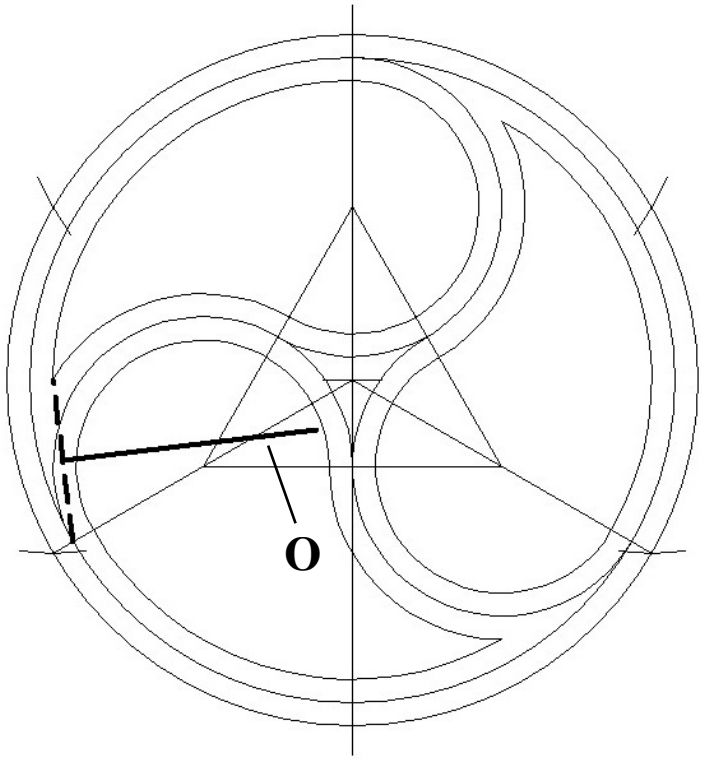


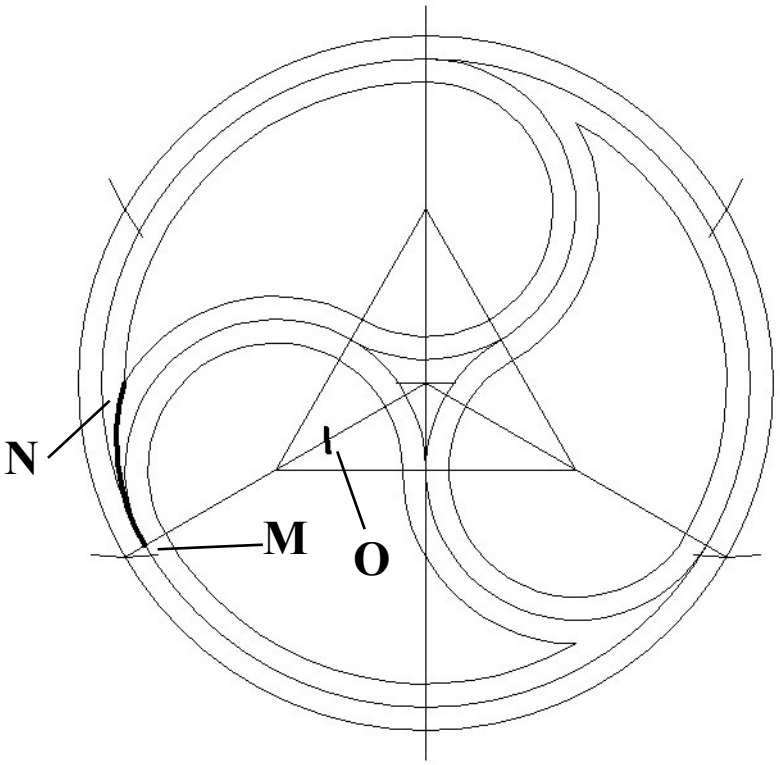
17) Erase the highlighted segments of the main inner circle.



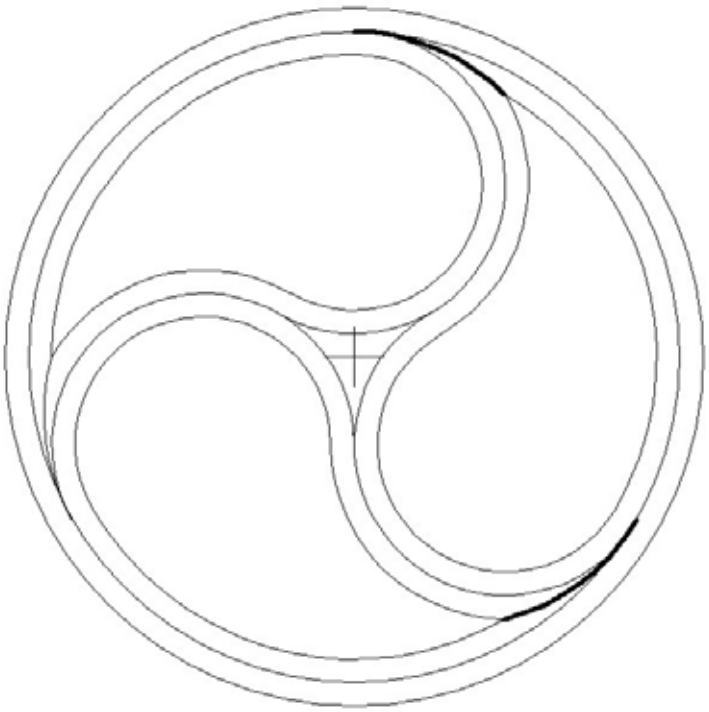
18) Draw a light reference line between points M and N. Measure between the 2 points, and place a mark at the centerpoint of the line.



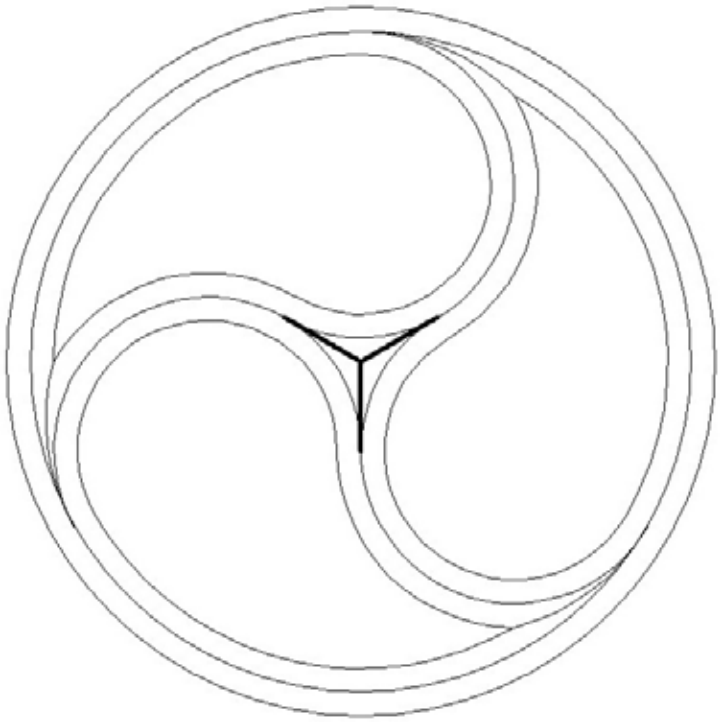
19) From the center-point between M and N, draw a perpendicular line that extends to create intersection O. Make a crosshair line at this point, then erase the 2 previous reference lines.



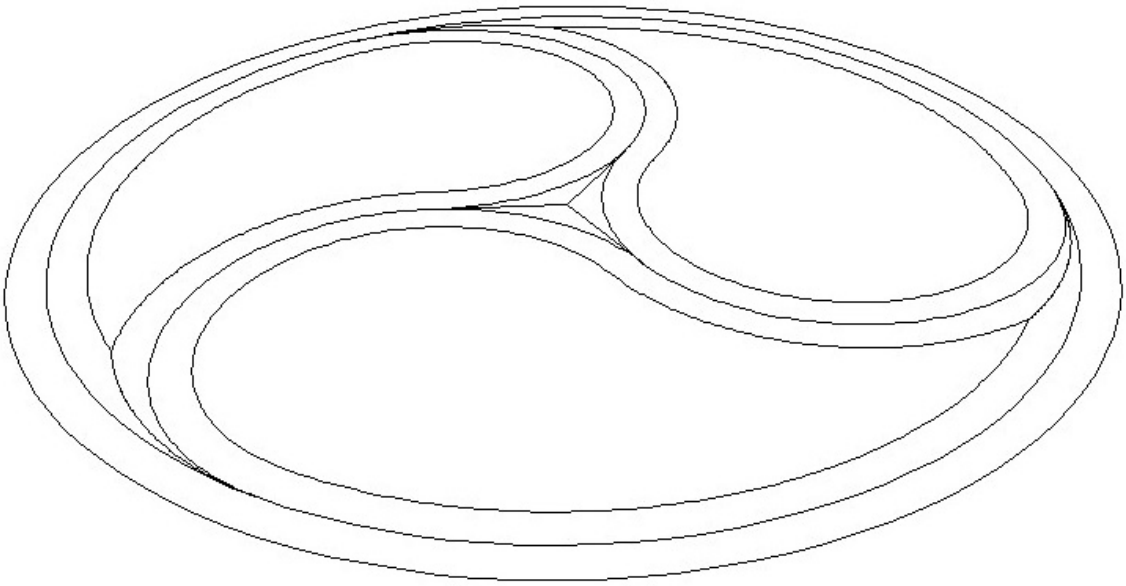
20) Adust the trammel points to span between point O and point N. Rotate to draw an arc between points N and M.



21) Repeat steps 18 through 20 at the other 2 spiral intersections, as shown above. Erase all reference lines except for the center crosshairs.



22) Draw 3 lines extending from the center crosshairs to the center of the converging arcs, as shown above.



23) The completed Church Window pattern. The 3D effect of "beveled" edges and/ or a shadow appearance will rely on proper shading techniques during the staining process.