

# *Celtic Knotwork*



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*Part 1*

## **Introduction**

This document provides an introduction to drawing Celtic knotwork patterns, based on a workshop that I teach from time to time. Knotwork is a style of ornamentation that simulates intertwined cords, and can be found on monuments, jewelry and in ancient manuscripts, such as the Book of Kells or the Lindisfarne Gospels. It started appearing around 450 CE throughout Britain. Although other Celtic designs may have originated in the Middle East, knotwork appears to be native to Britain.

There are a number of other types of Celtic designs, such as keys, spirals and checkers, but I am only going to focus on knotwork. In this first part, we are going to create a knotwork pattern that looks like this:



*Figure 1 - Completed Pattern*

The techniques that you will use to create this pattern can be used as the base to create probably 80% of various other knot patterns. That will be the topic of part 2.

There are a couple of different approaches for drawing knotwork. The one I favor provides a balance between some simple math and some art skills—many of the other approaches only work well for people who are gifted artists, which I am definitively *not*.

Based on some of the pitfalls I have seen when teaching this technique, I intend to over-explain in a number of places, and also to break out steps that are easily combined. I apologize if you find this annoying, but once you have figured out the steps for yourself, you will be able to move more quickly.

I draw knotwork because I find it extremely relaxing, and after some practice, hopefully you will too.

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## Getting started

The basic materials needed for drawing knotwork are pretty simple:



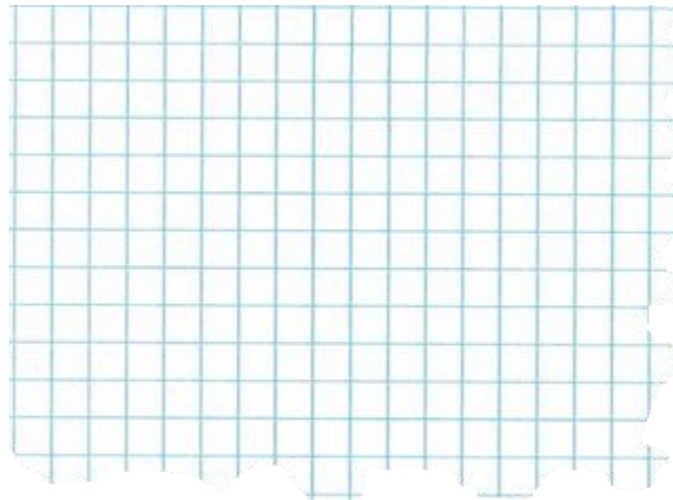
*Figure 2 - Basic Materials*

- **Pencil** – A basic 2B pencil will work fine, although harder pencils (such as a 2H) will give you finer lines that are easier to erase (so long as you don't press too hard).
- **Inking pen** – An ultra-fine-point Sharpie works well, but if you want to spring for something fancier, such as a Pigma Micron (02 or 03), you will have less trouble with inkblots.
- **Ruler** – This is one of the few cases where an Imperial ruler (inches) vs. metric (centimeters) is more convenient since you will need to divide spaces into halves and quarters. A clear or at least partially see-through plastic ruler works well since it lets you see where you are.
- **Eraser** – Anything that doesn't shed too much or mark up your paper.
- **Paper** – Although any paper will do, acid-free art paper works well. In fact, in this tutorial, we are going to start out using graph paper, which will make things easier up front.

In addition to these items, there are a few other things that might be useful:

- **Short ruler** – A 12” ruler is good for the big stuff, but you will be doing a lot of short lines, and I find that a 6” ruler makes this easier. Again, a see-through ruler with clear hashmarks for  $\frac{1}{2}$ ”,  $\frac{1}{4}$ ”, etc. is best (look closely before buying—cheaper rulers just have a number of equal-sized hashes between inches, which is annoying).
- **Coloring markers** – Regular/fine point sharpies or colored pencils, or anything you’d like to use to color in and around your design. You don’t want to use your inking pens since that will a) take forever and b) will damage the tips.
- **Tissues** – If you keep dragging your hand over your work, you can smudge the pencil and the ink. I often rest my hand on a tissue to prevent this, although another piece of paper also works. Tissues are also handy if you screw up your design and feel like crying.
- **White out** – In case you make a mistake during inking.

Often you will be drawing your design on plain paper, but to start out with this tutorial, we are going to use graph paper:



*Figure 3 - Graph Paper*

Most office stores carry graph paper – either loose leaf (although this usually comes 3-hole punched) or as a block pad. I am using  $\frac{1}{4}$ ” ruled graph paper, which is very convenient for setting up (since 4 squares makes an inch), but it doesn’t really matter the size.

Using graph paper saves a bunch of up-front time. I will often use it when I am playing with designs, or if I’m going to transfer the design onto a different paper or material. You can get graph paper in lots of different sizes (for example, I have some 2-millimeter graph paper for very fine images).

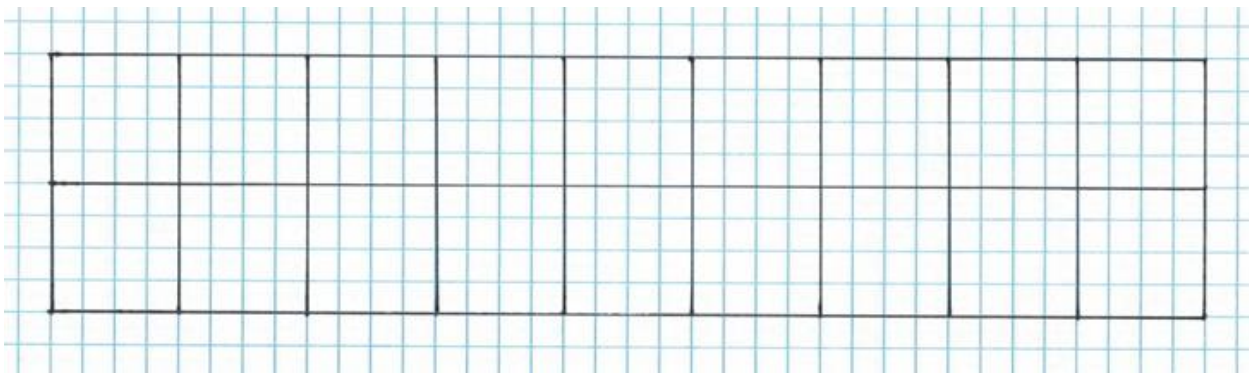
The only downside is that the length and width of the squares are the same, which can be a limitation. A lot of “classic” knotwork designs are drawn with a 3/4 ratio (i.e. ¾” high by 1” wide sections). I’ll talk more about this in part 2.

### **Knotwork on Graph Paper**

In this section, we’ll go through the whole process of creating the design on graph paper.

**Note:** For clarity, I’ve drawn setout lines in ink, but you should be doing these parts in pencil.

#### **Cells**



*Figure 4 - A 9x2 grid of cells*

The first step in creating our design is to create cells to contain the image. In figure 4, I’ve created a grid that is 9 cells wide and 2 cells high.

There is no hard-and-fast rule as to how many cells you can have, but here are few notes:

- A one-cell high pattern can only support a very simple interlaced pattern.
- Odd numbers *tend* to lend themselves to single continuous paths (instead of having multiple independent paths). There are many other factors here, though.
- If you want a repeating pattern, then you want to make sure you have a size that is easily divisible by the size of the pattern. For example, if you look back to figure 1, you will see that we have broken the pattern every 3 horizontal cells – this works well with a number of cells divisible by 3 (such as 9). If there had been, say, 8 horizontal cells, then the design would not appear so symmetrical.

As for the size of your cells – they can be any size you like, and they don’t need to be squares (they don’t even need to be rectangles—something I’ll cover in part 3). However, you will end up dividing your cells to figure out where to place your quarter-points, and your quarter-points are called *quarter-points* because they are literally one quarter the size of your cells!



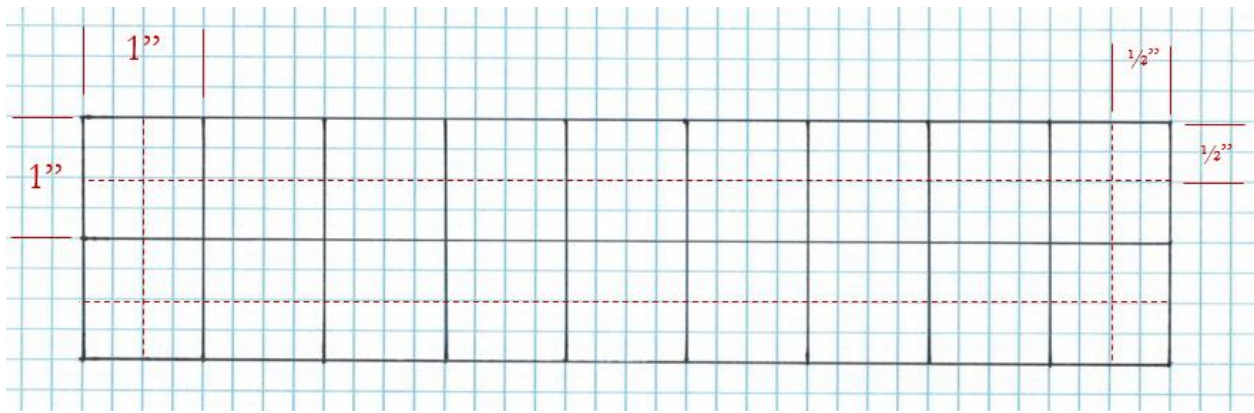


Figure 5 - Grid with measurements

In our case, each cell is precisely one inch wide and one inch high – this was easy to do on the graph paper, since each graph-paper square is  $\frac{1}{4}$ " by  $\frac{1}{4}$ ", so four squares makes an inch.

Working with one-inch squares makes life easy for our other calculations, since half of a unit is  $\frac{1}{2}$ " (and two graph-paper squares) and a quarter is  $\frac{1}{4}$ " (and one graph-paper square).

But let's say you wanted to use different sizes. I do a lot of designs that have  $\frac{1}{2}$ " cells. In that case:

- The half-way lines would be at  $\frac{1}{4}$ "
- The quarter-points would be at  $\frac{1}{8}$ "

As I mentioned, you also are not required to have the height and width be the same. A lot of original knotwork designs have a 3 to 4 ratio, so if the width of the cells was still one inch, the height would be  $\frac{3}{4}$ " of an inch and:

- The *vertical* half-way lines would be at  $\frac{3}{8}$ "
- The *vertical* quarter-points would be at  $\frac{3}{16}$ "
- The *horizontal* half-way and quarter-points would still be  $\frac{1}{2}$ " and  $\frac{1}{4}$ " as before.

If you are a bit rusty with fractions, it is actually very easy to divide a fraction by 2 – just multiply the denominator (the number at the bottom) by 2. To get to the quarter values, just do it again. This makes figuring out sizes using imperial units (inches) much easier than with metric units—one of the few times where that is true!

Of course, if you go for odd sizes, you might not want to use graph paper, since you will lose much of the advantage of having the nicely placed squares.

For the purpose of the tutorial, go ahead and draw your 9x2 cells *in pencil*. Use your ruler to draw in the straight lines, but you don't have to worry about measuring – just make sure that each cell is 4 graph-paper boxes high and wide.

### Adding your quarter points

This is what your design should look like by the end of this section:

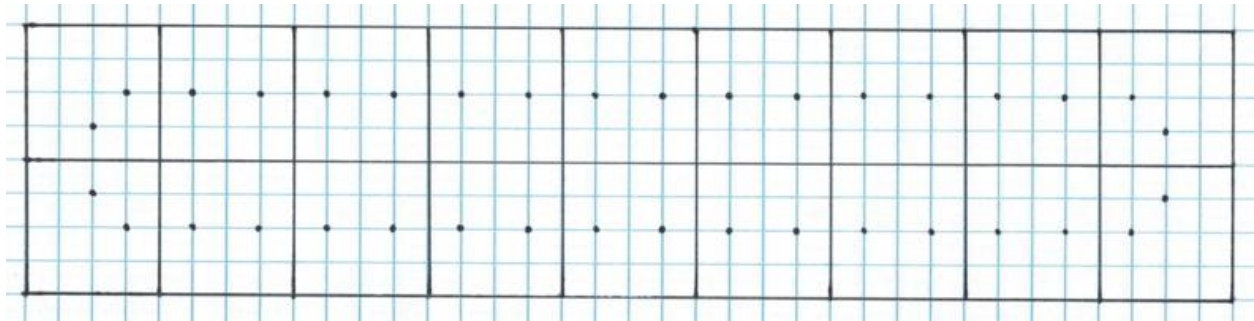


Figure 6 - Quarter Points

You will eventually draw diagonal lines between these points, and those lines will create the inside paths that make up your design.

Why are they called quarter points? Because the distance from the edge of the cell to each point is one quarter of the size of the cell.

To draw the quarter points, you need to figure out the central point of the cells (which is easy here, because the cells are 4 squares by 4 squares, so half way is simply 2 squares or  $\frac{1}{2}$ ). Place your ruler along this line:

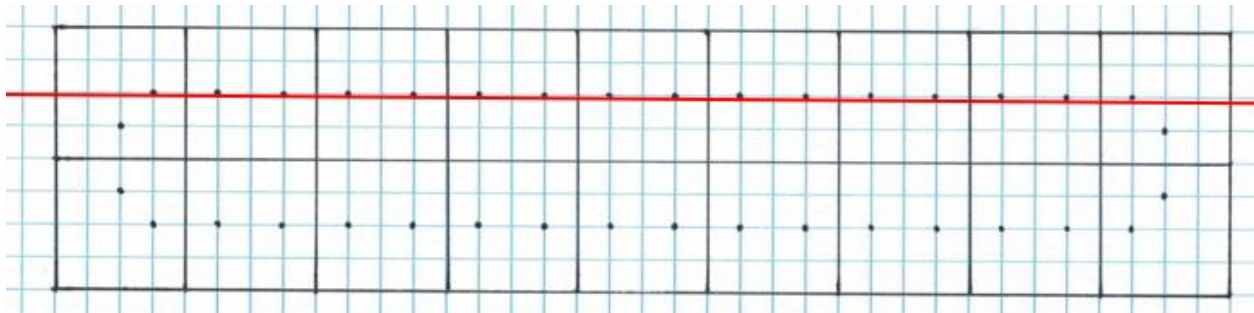


Figure 7 - Ruler line for drawing quarter points

Think of the red line in the picture as the edge of your ruler. Now, for each of the inside lines, put a dot on either side if the line,  $\frac{1}{4}$  unit (so  $\frac{1}{4}$ " or one graph square). Do not put dots next to the far left or far right lines.

For the bottom row of cells, do the same thing. The process for the sides is the same – figure out the halfway line for the far-left cells and put your rule in position:



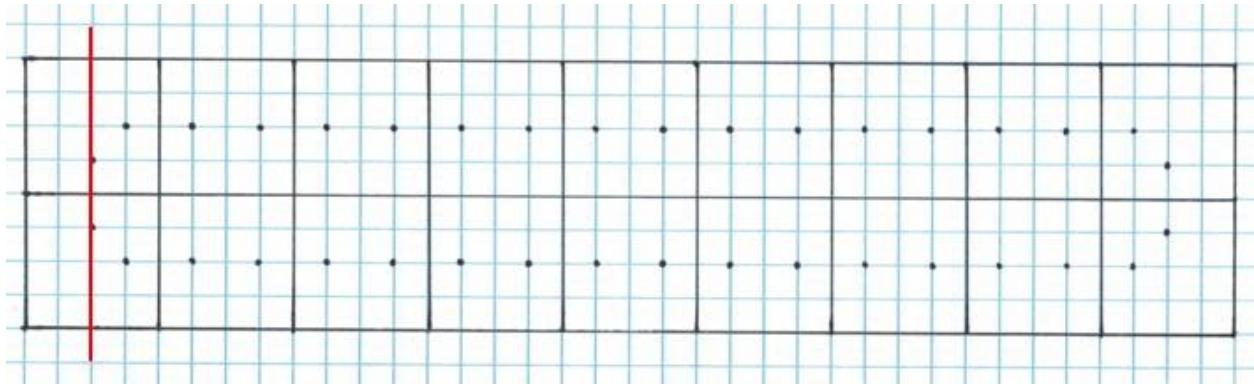


Figure 8 - Ruler line for left-most cells

Now, draw your dots  $\frac{1}{4}$ " away from the center line. Note that this is really exactly the same process as for the top and the bottom – you are drawing dots  $\frac{1}{4}$ " away from all of the lines except the edges of the shape – it's just that, because our shape is only two cells tall, there is only a single line for which we are drawing quarter points. It is a little more obvious when working with a shape with more cells:

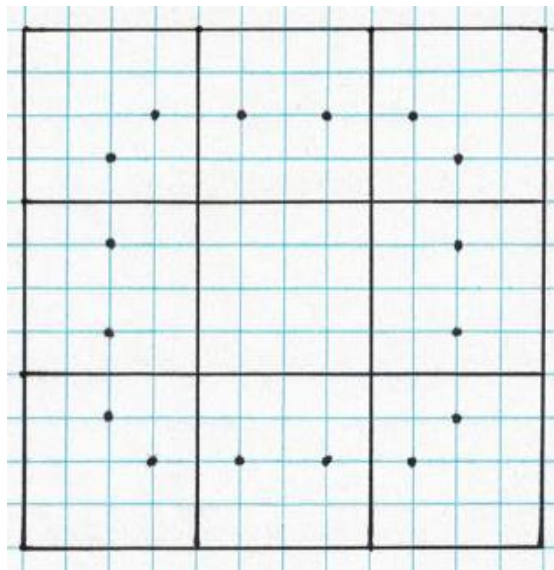
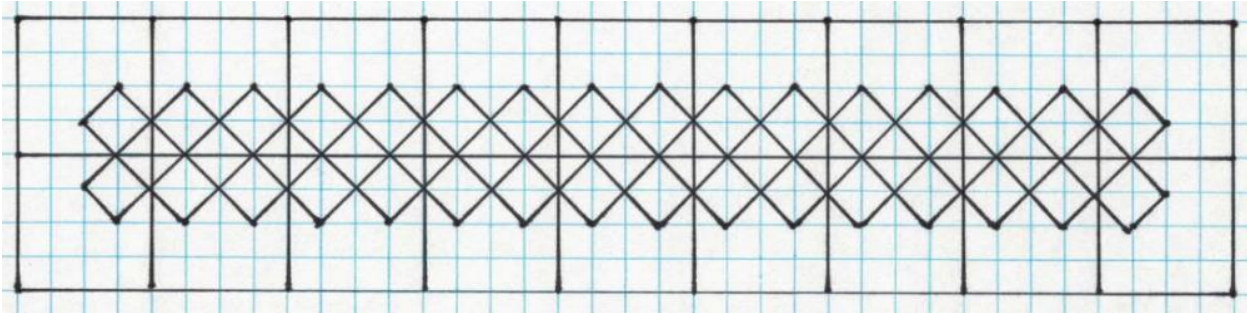


Figure 9 - 3x3 cells with quarter-points

In this 3x3 cell design, you can see that there are two inside lines in each direction, and the quarter-points are on either side of those lines. Note that there are no quarter points in the center. No matter how many cells you have (picture 50x50 cells), you only put the quarter points in the cells around the edge.

Connecting the dots

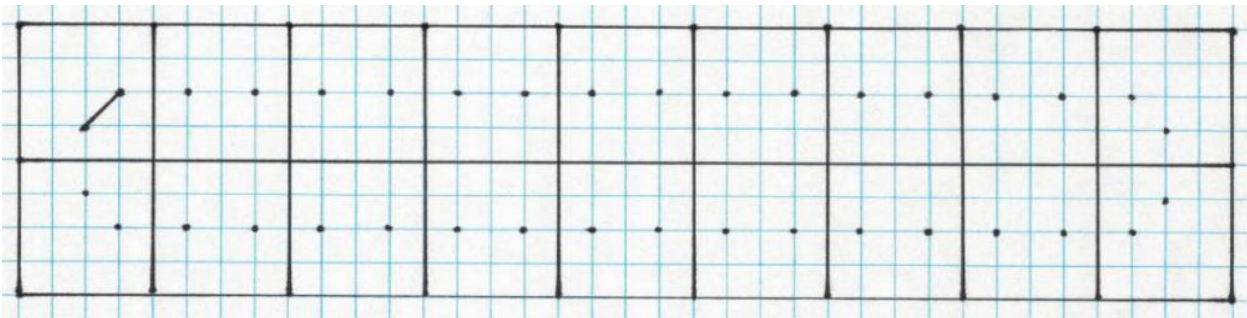
The next step is to start connecting all of the dots together to form lines. The final goal of this step is to end up with a pattern like this:



*Figure 10 - The final dot-to-dot pattern*

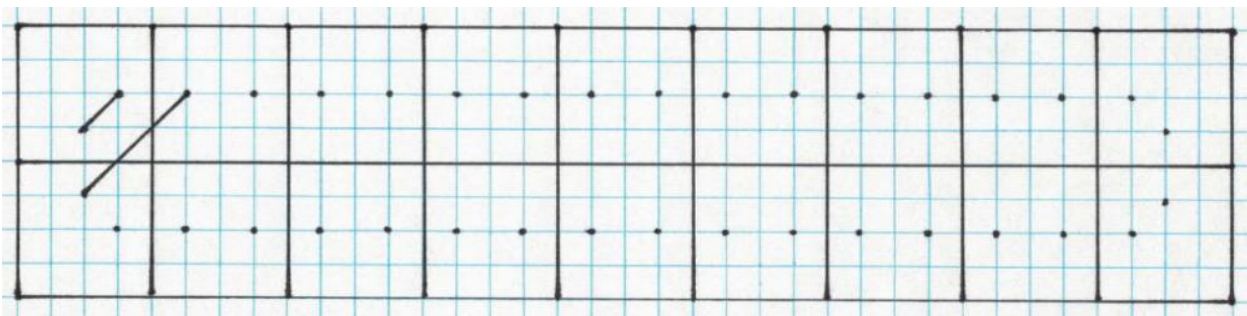
This is a good place to use a short ruler. And, just a reminder, you should still be using pencil at this point, or the erasing section is going to be quite disappointing!

Start in one corner, and just draw a line to connect the two close-together dots:



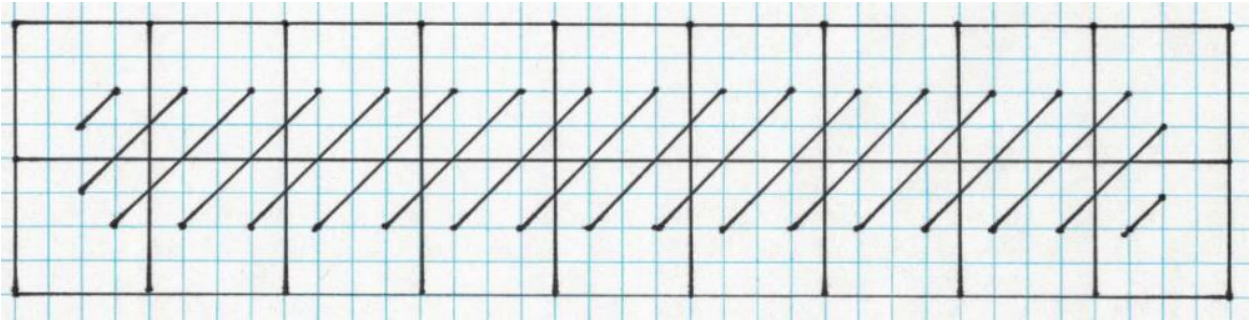
*Figure 11 - Connecting the two corner dots*

Then move to the next two dots (just slide your ruler over, trying to keep it parallel to your first line) and connect those dots:



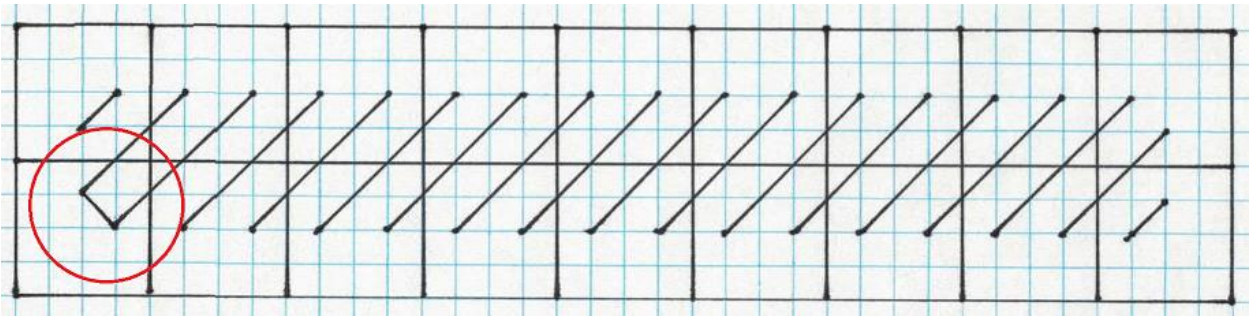
*Figure 12 - Connecting the next two dots*

Then just repeat until you get all the way to the end:



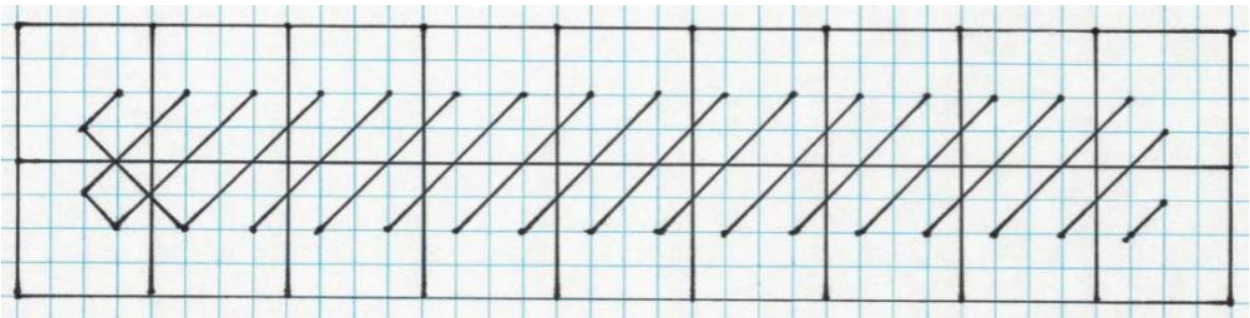
*Figure 13 - All dots connected in one direction*

The process is the same going the other way. Start in one corner and connect the two dots:



*Figure 14 - Connecting the first two dots going the other way*

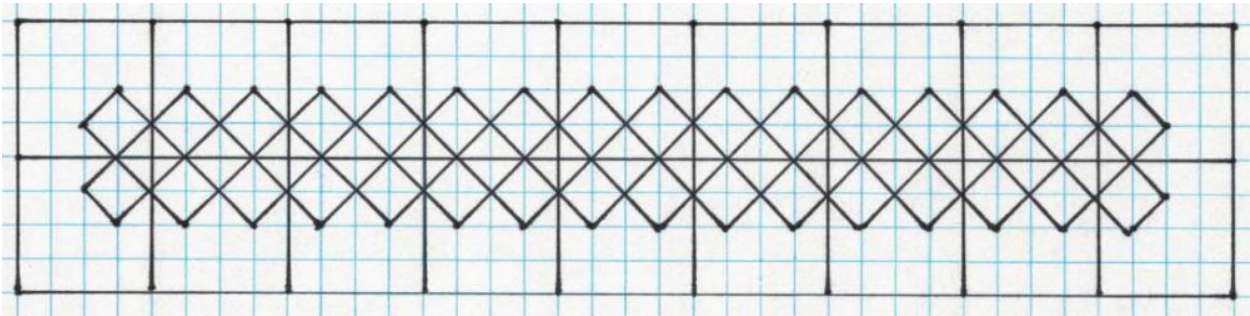
Then do the next two dots:



*Figure 15 - Connecting the next two dots the other way*



Then repeat until done:

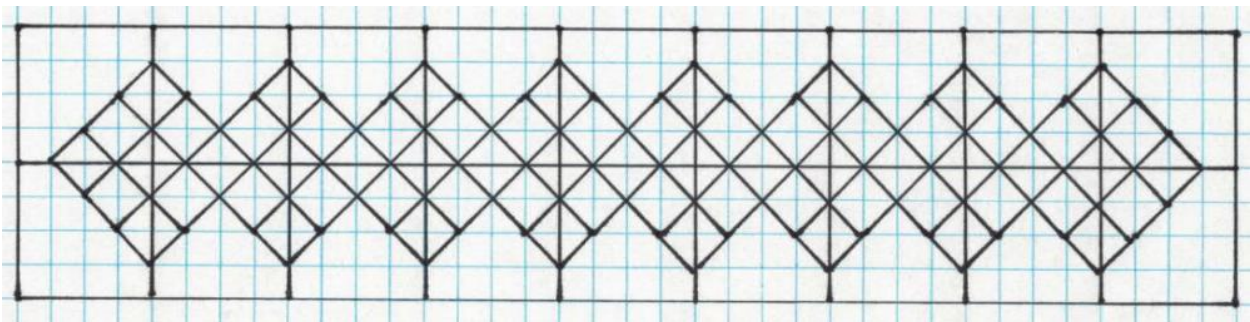


*Figure 16 - All the dots are connected*

It isn't knotwork yet, but the glimmerings of a pattern are starting to appear.

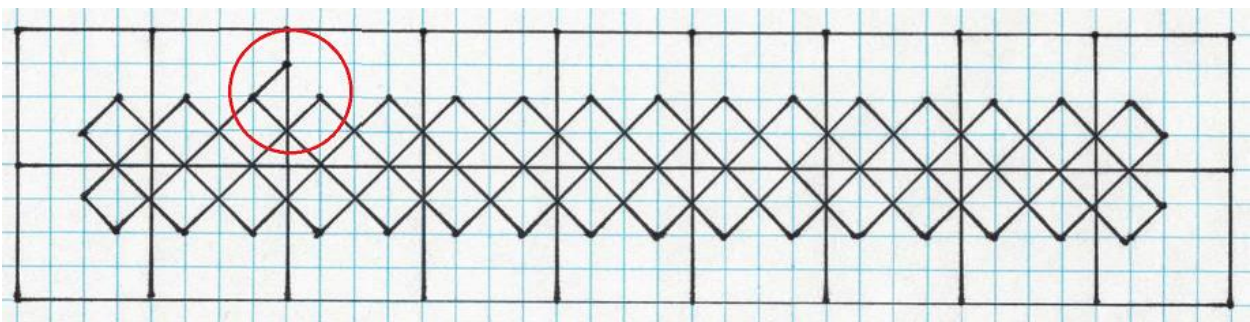
### Extending the lines

The pattern that we've drawn needs to be extended in order to provide easy anchor points for starting to draw in our curves. To do this, we just need to lengthen the diagonals so that they make it all the way to the cell dividing lines. The goal is an image that looks like this:



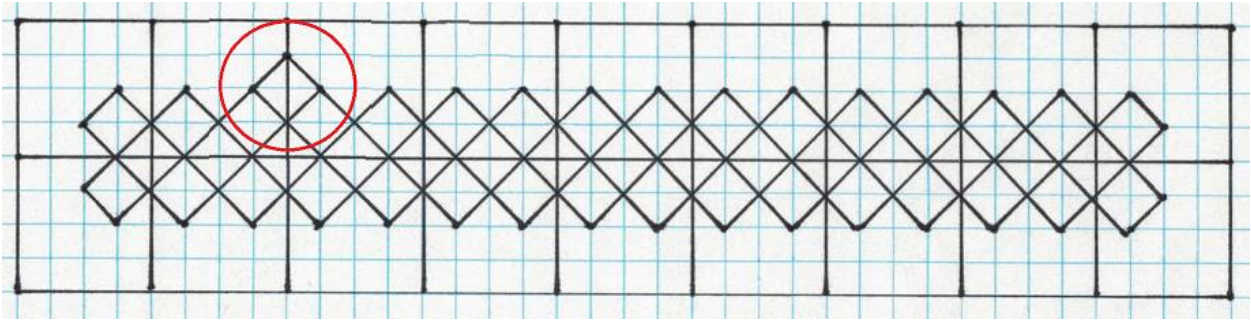
*Figure 17 - Extending all the diagonals*

It is easier to do this than it might look. All you need to do is extend each of the lines:



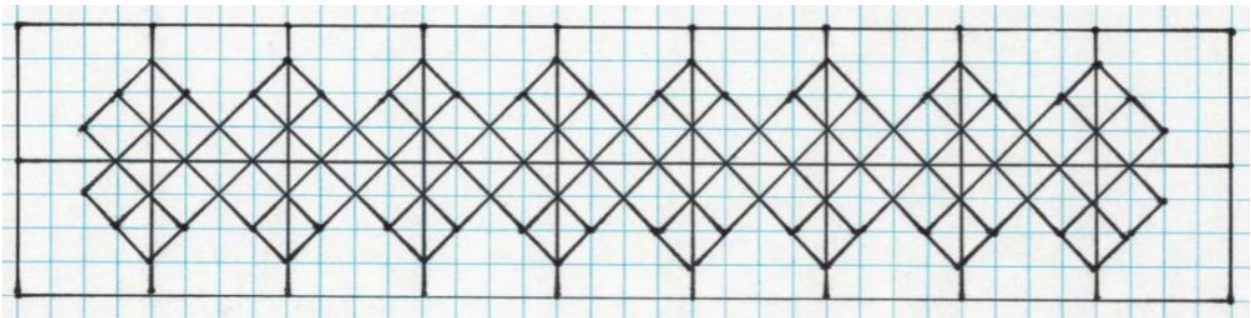
*Figure 18 - Extending a single diagonal*

And, of course, you need to do it in both directions:



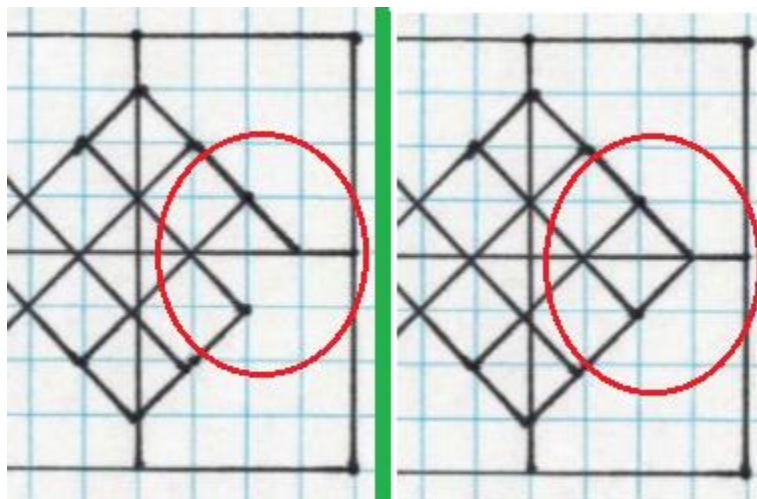
*Figure 19 - Joining the extended diagonals*

You can do the connections individually, with or without a ruler, but I generally just slide a ruler along and do all of the lines in one direction, then all of the lines in the other. One more reminder—you should still be in pencil!



*Figure 20 - All of the vertical lines extended*

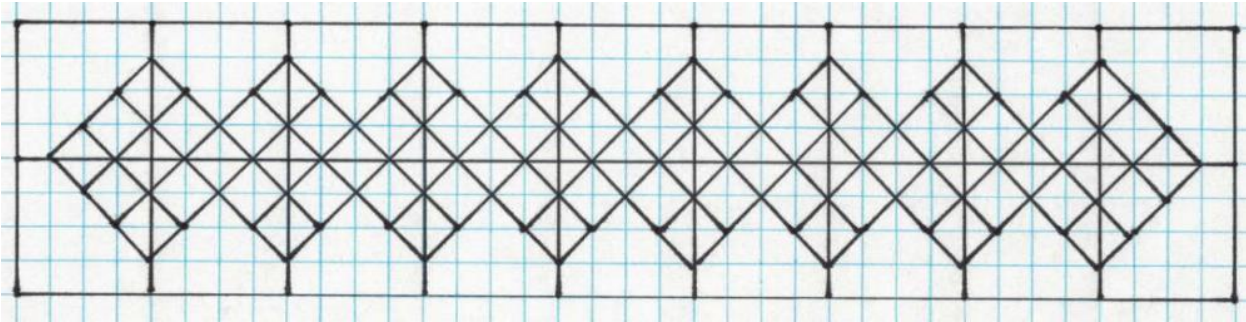
And finally do the same thing for the two ends:



*Figure 21 - Closing up the end*



The final image should look like this:



*Figure 22 - All the lines extended*

If you squint just right, you can sort of see where the cords go.

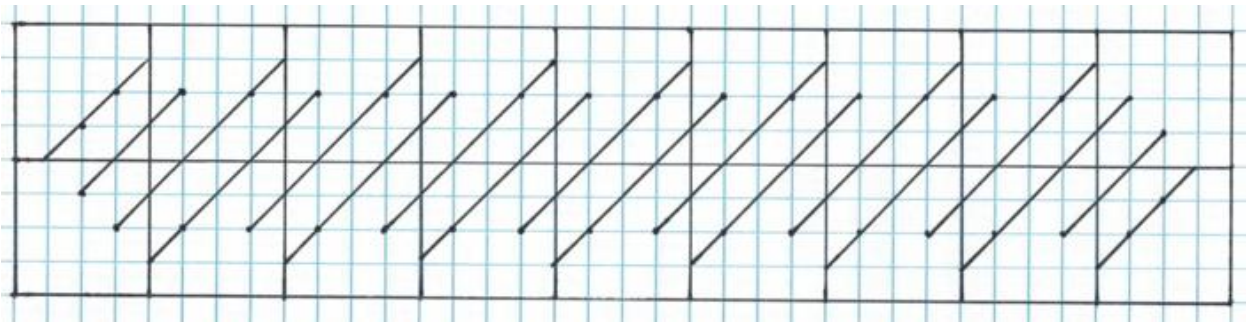
#### Combining the join-the-dots and the extending the lines steps

I have a confession to make. I never do the last two steps separately. Since the goal is to have lines going all the way to the lines, I just extend the lines at the same time as I am connecting the dots. There are two big advantages to doing it that way:

1. You end up with straighter, cleaner lines.
2. It takes a lot less time!

The problem, however, is that until you are used to the process, it can be quite confusing. I'll talk you through the quicker process, but feel free to do everything as two separate steps if you have trouble with this alternative approach.

The first step is to draw the diagonals going in one direction:

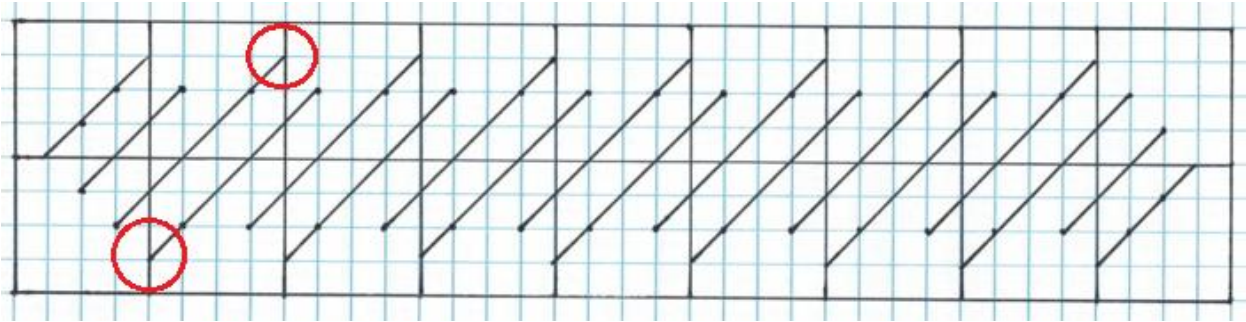


*Figure 23 - Drawing extended diagonals in one direction*

If you look, you will see that I just drew the same lines as before (look at figure 13 for reference). However, instead of stopping at the dot, I extended each diagonal whenever it would intersect with an inner-cell border (do not extend any lines to the outer cell borders).



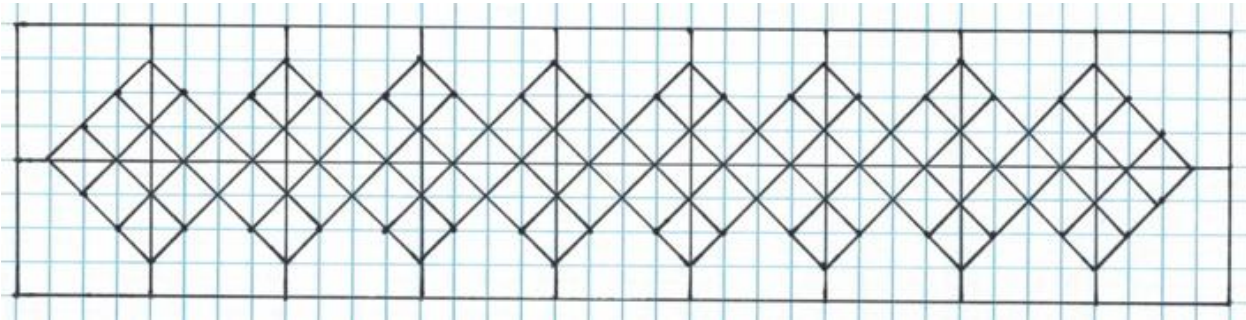
If you ignore the first two diagonals on each end, then you can see that there is an alternating pattern—the third diagonal extends to the dividing line at the top-right, the fourth diagonal extends to the dividing line at the bottom-left, and so on.



*Figure 24 - 3rd diagonal extends to the dividing line at the top, the 4th extends to the bottom*

The first two lines actually follow the same rules, but they look a bit different. The first line extends in both directions (extending to the bottom of the cell as well as to the right edge). The second line is not close to any cell edge so doesn't extend at all.

Once you've finished going one way, you just do the same thing, but in the other direction. This is usually a bit simpler because you are connecting up with spots where the diagonals intersect.



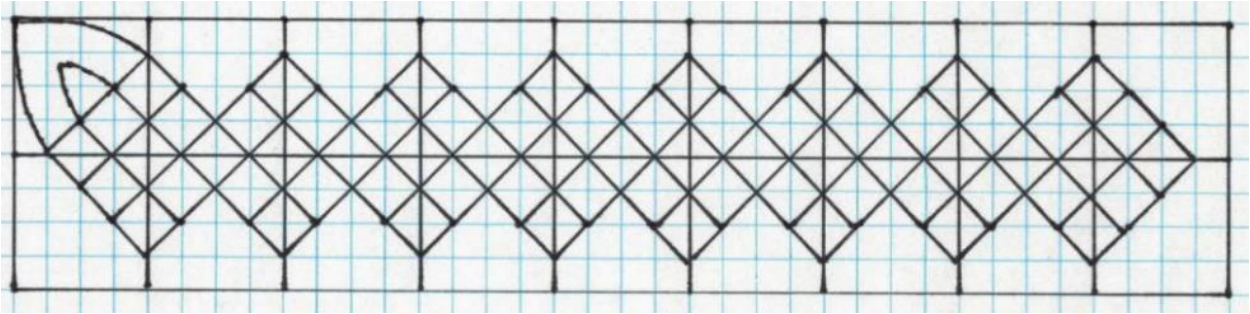
*Figure 25 - Adding the diagonals going the other way*

As you can see, figure 25 looks just like figure 22, except that it is a bit tidier, and took fewer steps.

One note – it is very easy to accidentally fail to extend a line here or there when you are following this process. If you do, it is no big deal—just go back and extend the missed lines in the same way you would have done in the “Extending the lines” step.

### Adding in corners

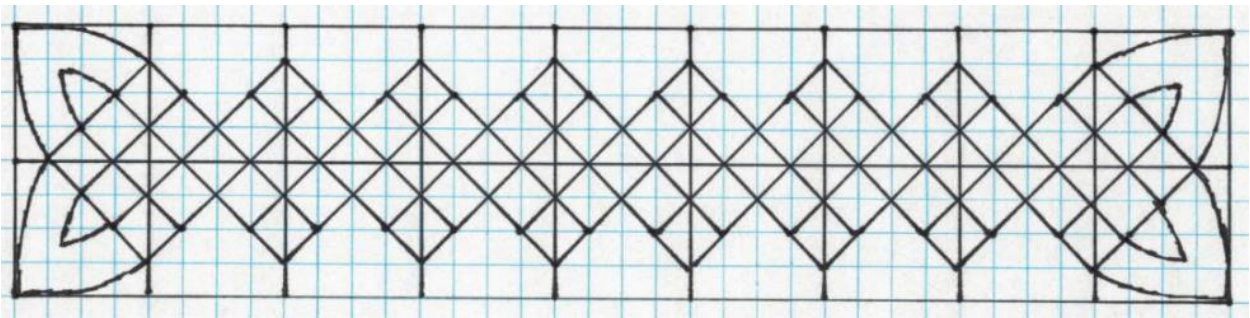
This is the point where we start moving away from math and more towards art. The next step is to add in the corners, which is done freehand, (in pencil):



*Figure 26 - Adding in a corner*

The sharp archway corners are common in knotwork, although they are only one of many finishing options. Since you are still using pencil, you can take your time getting the shape right, extending the lines in short little bits. Try to keep the inside space of the cord as consistent as you can.

Then fill in the other four corners:

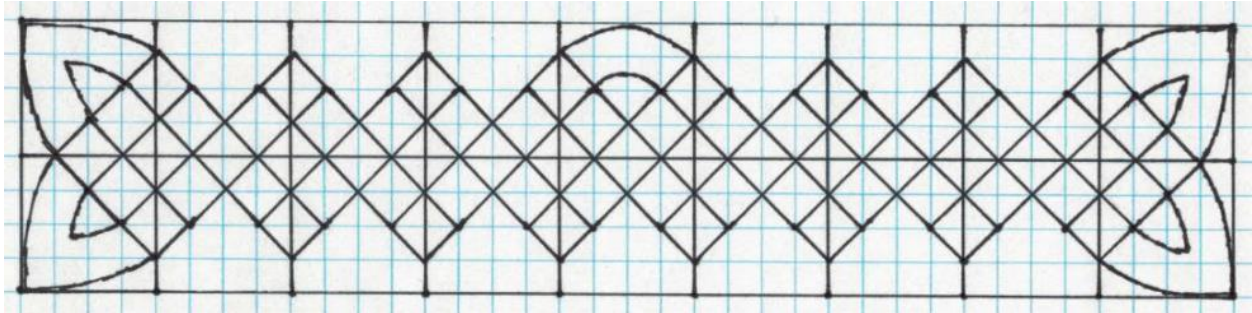


*Figure 27 - Adding in the rest of the corners*

If you are more comfortable drawing in a particular direction, feel free to rotate the page.

Adding in the curves

The next step is to add in the curves. In this design, the curves all fit inside their individual cells, so are fairly straightforward, and it doesn't matter where you start:

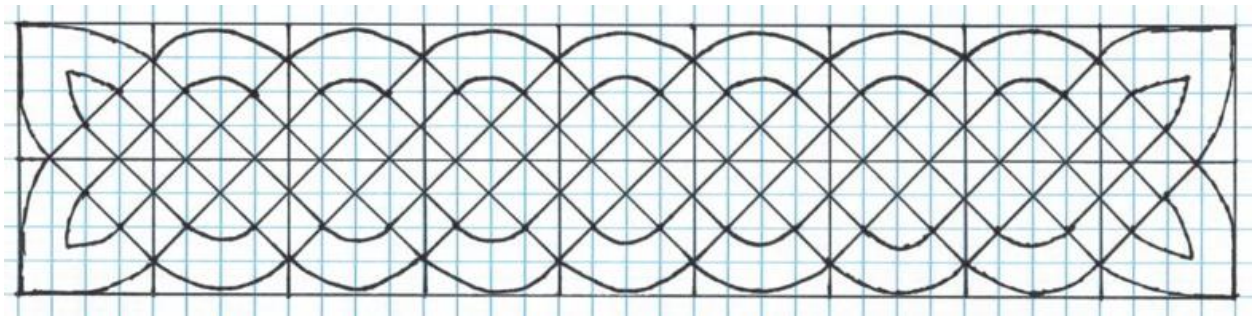


*Figure 28 - A first curve*

You may notice that the top of the curve is exactly half-way between the edges, so, if it helps, you can think of it as drawing two curves, each ending at the top, center point.

As with the corners, you should try to keep the spacing of the cord as consistent as possible.

Go ahead and draw in the rest of the curves:



*Figure 29 - The rest of the curves*

At this point you have something quite artistic, and you can get an impression of the final design.

Breaking the pattern

I'm going to switch from pen to pencil at this point (which will match what you should have been doing all along):



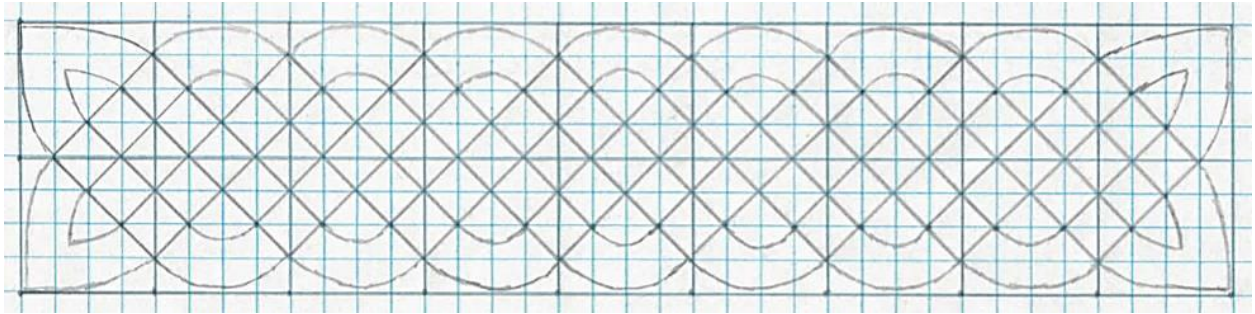


Figure 30 - From pen to pencil

It is a little harder to see, but the next steps involve erasure and inking.

Technically we could start the inking process now and have a perfectly respectable design. However, it would be a bit boring. Instead, we are going to *break* the pattern in a couple of spots. This is a technique we will rely on heavily in Part 2.

Since the design is 9 cells wide, we will do our breaks every 3 cells:

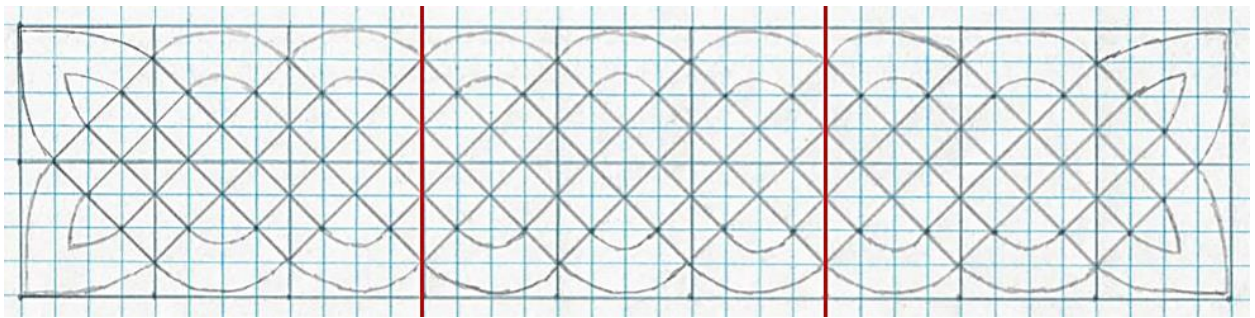


Figure 31 - Break lines

We will also do our break in different directions – first up, and then down.

To create a break, we are going to change the flow of our cord, splitting a continuous section into two. To start, we'll sketch in the new shape:

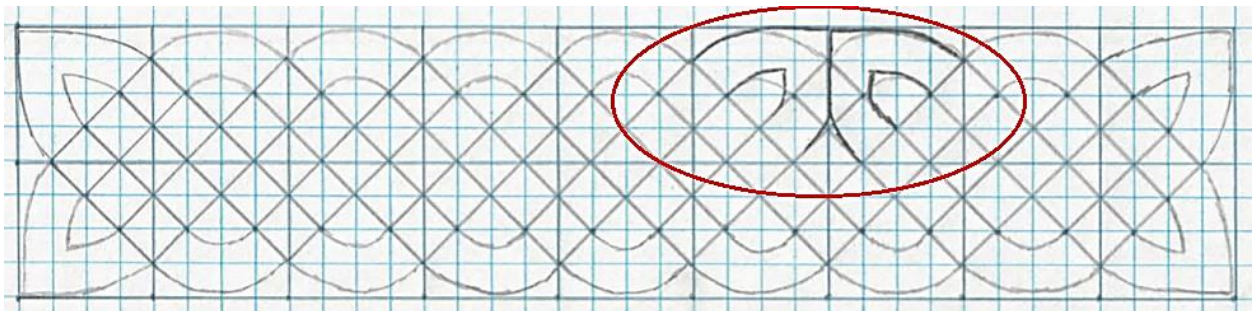


Figure 32 - Starting a break

Note that I've just drawn right on top of the existing lines, created arch-ish shapes so that instead of two simple curves, the design is curving back. The shape is very similar to the corners, but is more angular on the inside. If you erase the remnants of the old pattern, it is much easier to see:

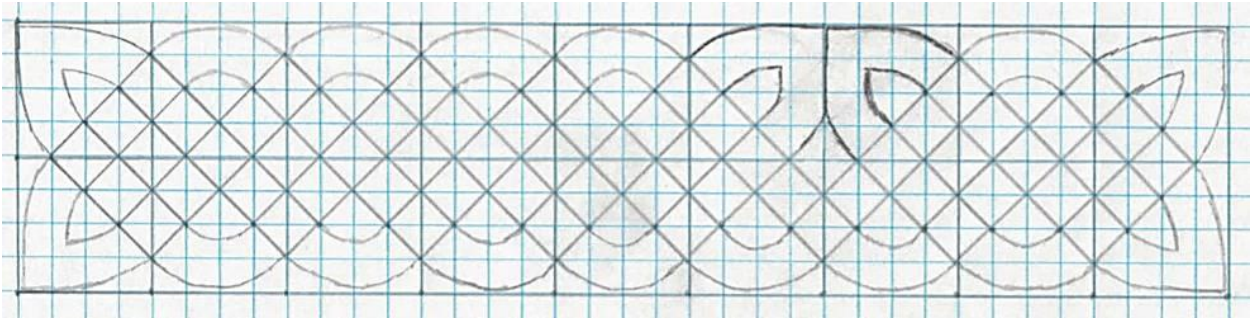


Figure 33 - Erasing the ghost lines in the break

Note that I drew in the new pattern quite dark in order to create a contrast. This will make erasing it harder later. You should make it as dark as you need to, but don't go crazy. Let's add in the other break:

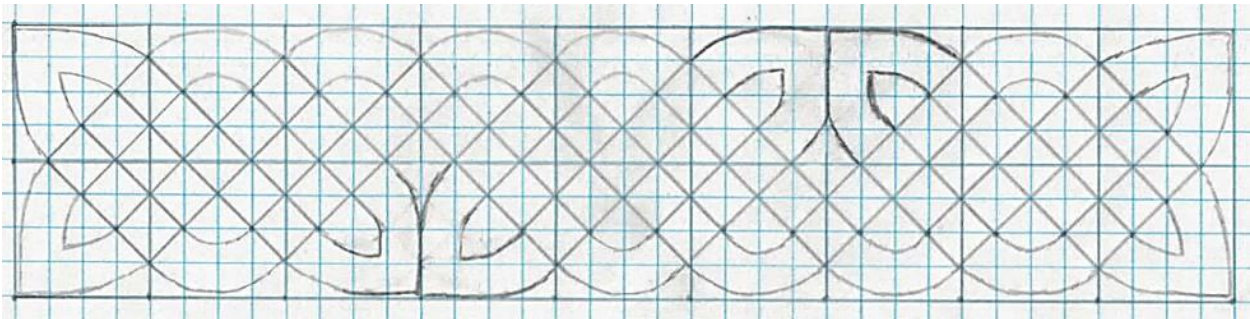


Figure 34 - Second break

It is now time to retire your pencil – we have finished the design, and can start inking!

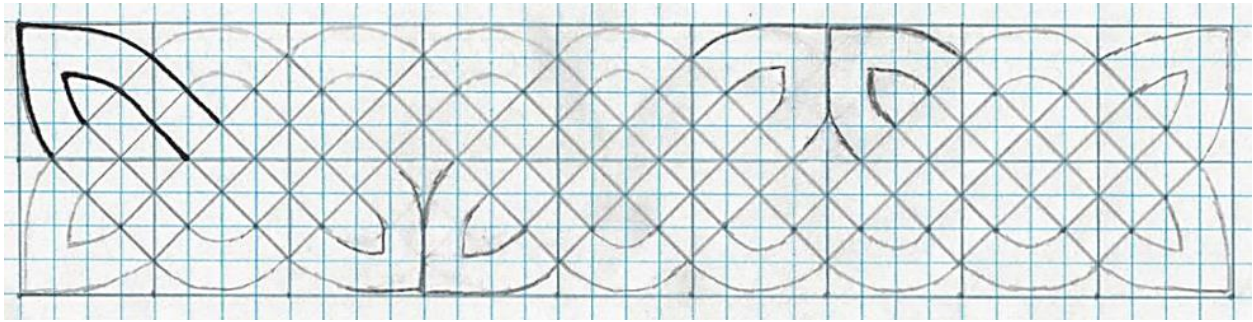
### Inking

Inking in the pattern is my favorite part of the process. It is fairly straightforward, but requires concentration in order to avoid accidentally crossing the wrong path. Particularly with complex patterns, I find myself sinking into a sort of Zen state where I can't think about other things, which is very relaxing.

You will need your extra-fine point marker for this stage. I like to follow the pattern from one corner until I return to the starting point. With this design, there is a single path, so when you return home, you will be done inking.

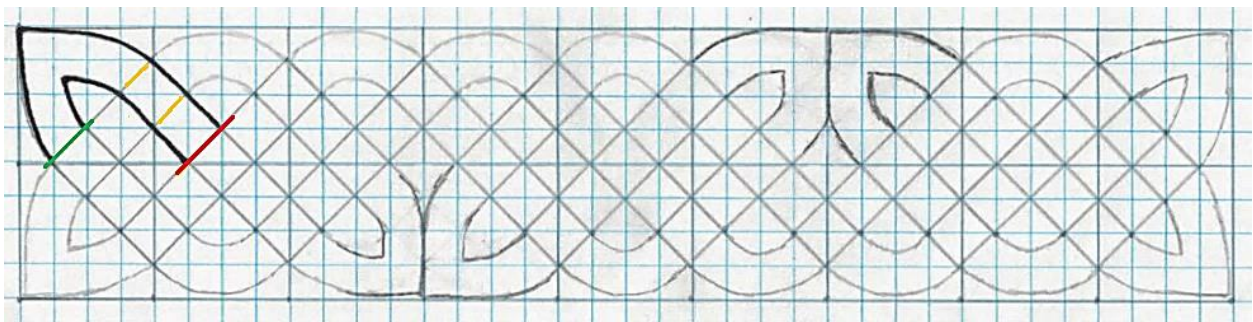
The important thing to remember is that each cord segment you ink should start at the edge of another segment, cross *precisely one other cord*, then stop at the edge of the next cord. Here is the first inked cord segment:





*Figure 35 - Inking the first segment*

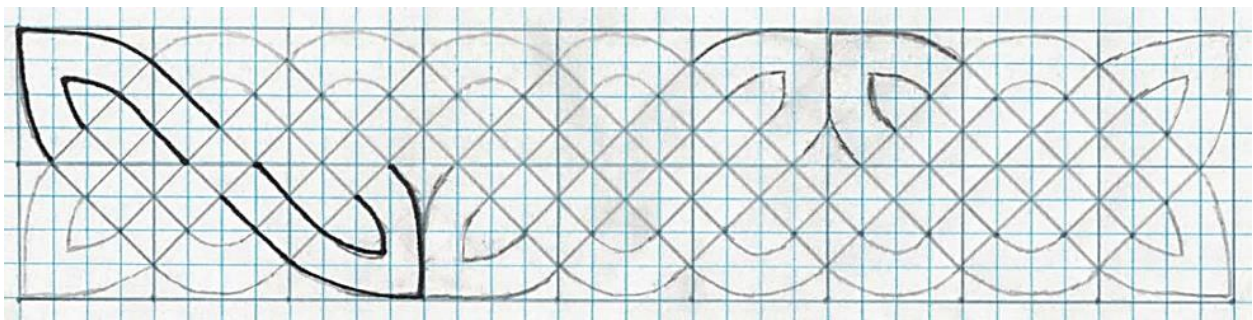
In the next figure, I've marked the start and stop points more clearly:



*Figure 36 - Start and stop inking on a segment, cross exactly one other segment*

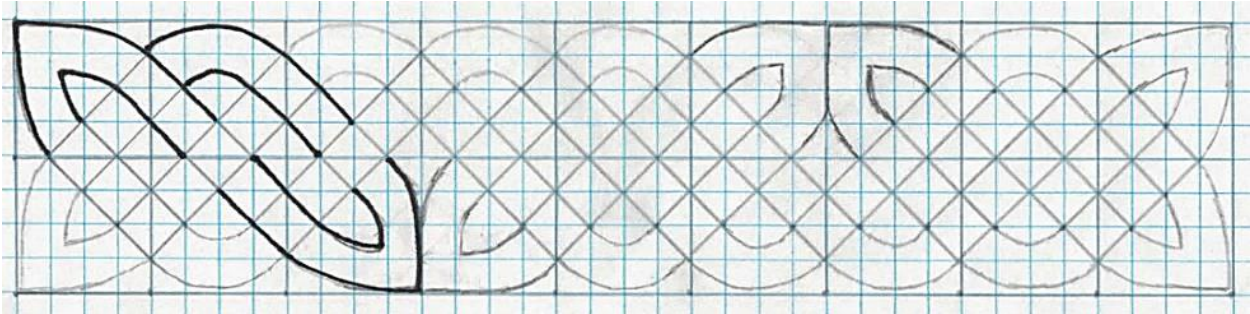
The inking starts at the green line, which is the edge of one segment, Crosses over a single segment (marked in orange) and then ends at the edge of the next segment, marked in red.

There is nothing special about where I started – you can start at any arbitrary segment, but I generally start at an edge. Here are the next few segments:

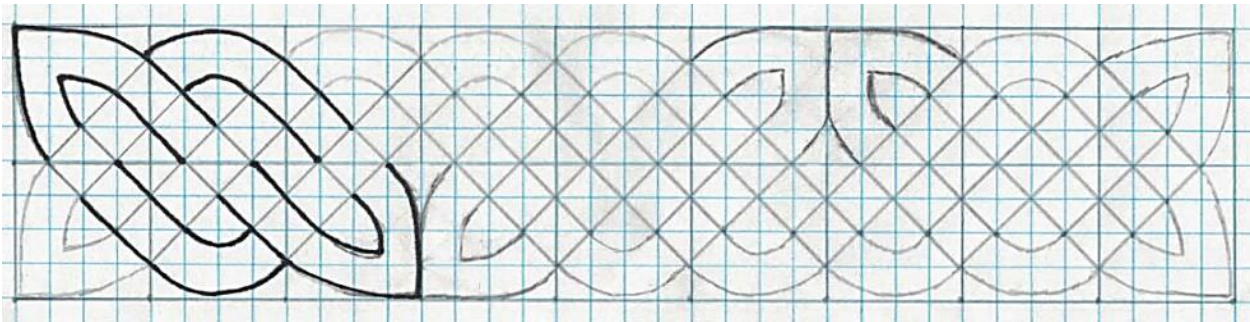


*Figure 37 - Segment 2 inked*





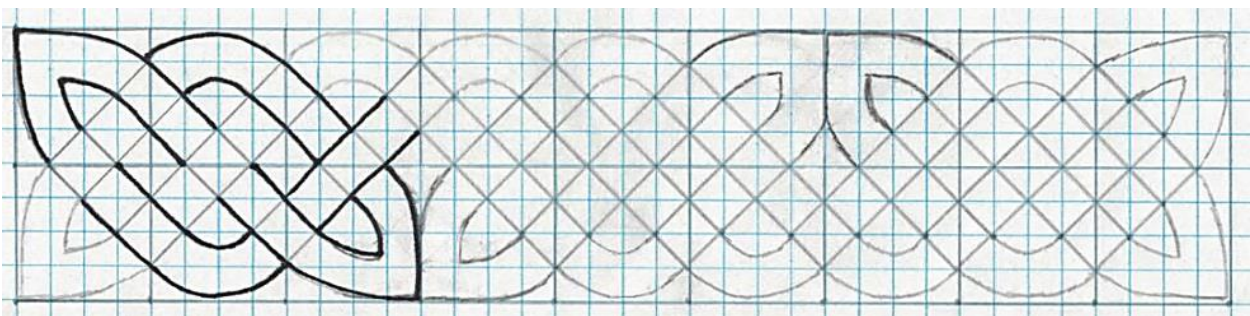
*Figure 38 - Segment 3 inked*



*Figure 39 - Segment 4 inked*

Notice with segment 3 (figure 38) that we run back into an already-inked segment for the first time. This obviously makes it easier to know when the stop, but remember that for any particular segment you might be going between two penciled segments, between a single penciled and a single inked segment, or between two inked segments.

You will also be drawing some shorter and some longer segments as you go. The first segment was quite long, whereas the next (5<sup>th</sup>) segment is as short as it gets:



*Figure 40 - Segment 5 inked - a very short segment*

From this point, you just need to keep going until you are done:

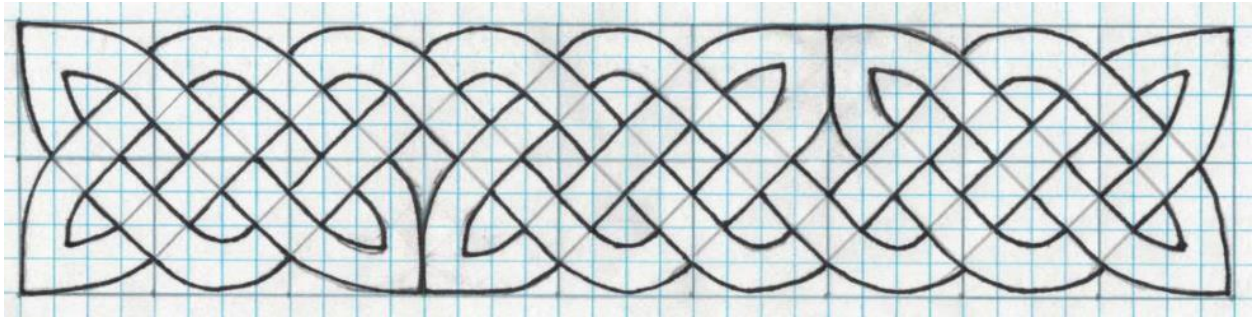


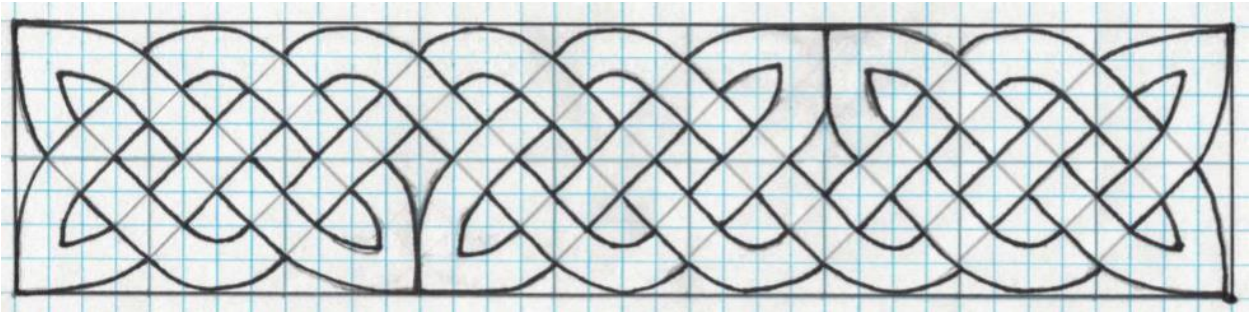
Figure 41 - The entire pattern is inked

Here are some thoughts and suggestions for the inking process:

- Make sure that you have another sheet of paper beneath your drawing or you will end up with little bits of ink on your table.
- Particularly when you are learning, figure out the start and end of where you are going to draw *before* you start drawing in any lines.
- If you are really nervous, you can always use an eraser to clear out the lines you are going to cross over.
- Rather than twisting your hand, turn the piece of paper so that the lines you are going to draw are comfortable.
- Try to draw each segment with a single smooth line, rather than in little bits. It will look a lot better. Use the heel of your hand as a pivot when drawing curves. (For the sharp corners, draw to the corner point, then rotate the paper and draw the next section of the segment).
- Use a tissue or a piece of paper to lean on so that you don't smear the rest of the picture.
- As you go, you can sweeten your curves and fix widths of lines that don't feel right.
- Don't worry if your inking isn't perfect. Remember, this is *art*. If it needed to be perfect, you could generate it on a computer. It is believed that the monks who worked on the major illuminated manuscripts always deliberately inserted a mistake. Personally, I don't have to do that deliberately, since I'll invariably screw up somewhere!

As part of the inking process, you can also go ahead and outline the box around your design. Use your ruler with the pen to get clean lines.



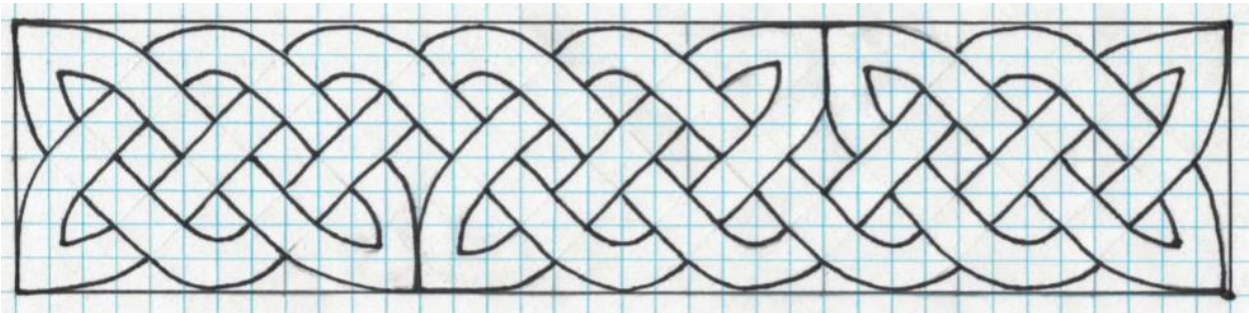


*Figure 42 - Inking in the box*

This step is optional – it depends on your final plans for the image.

### Erasing your framework

The next step is to simply erase all of the pencil marks:



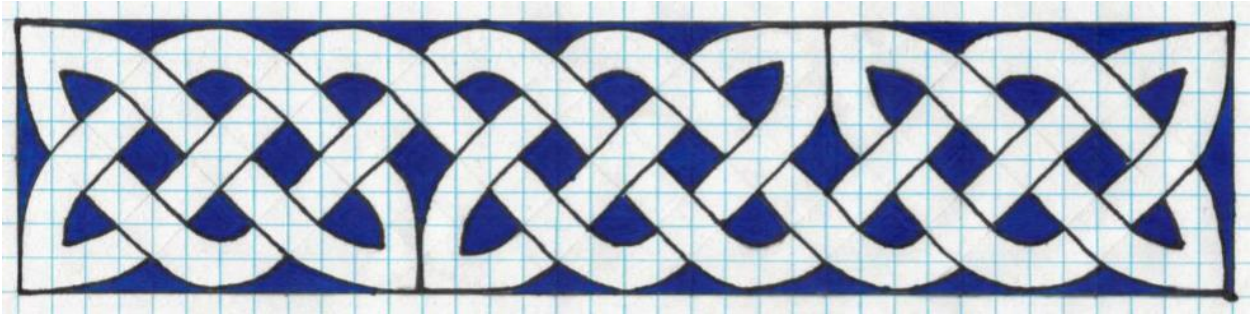
*Figure 43 - Erase all your lines*

I won't belabor this step since you hopefully learned how to erase in grade school. My only note is to make sure you support the section of the drawing you are erasing with your hand so that you don't end up scrunching up your work.

After you've finished erasing your lines, you might see some spots where your lines don't quite connect. Go ahead and touch up as needed.

### Coloring

We have a perfectly serviceable (and quite pretty) design at this point, but if you like, you can go ahead and color it in. It is very common to fill in the spaces around the cords in black or some other color (I've gone with blue):

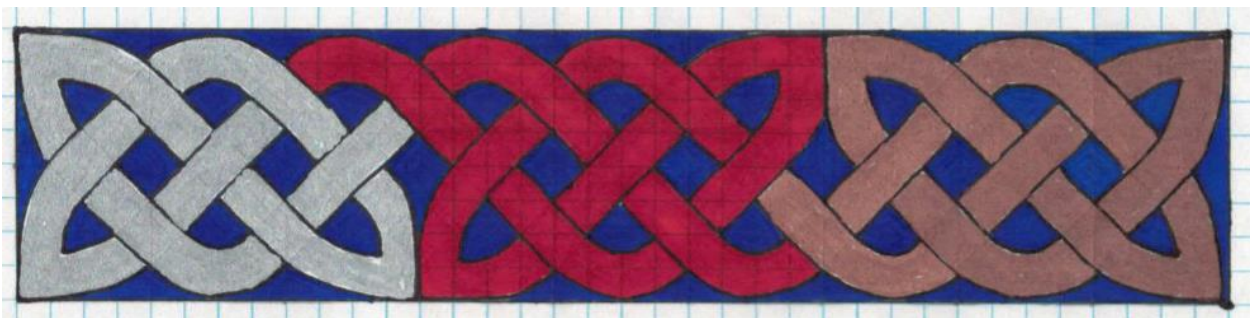


*Figure 44 - Inking around the cords*

You've probably been coloring since grade school as well, and you are probably better at it than I am (I got yelled at for my bad coloring skills), but I do have a few thoughts:

- As with inking, make sure you have something underneath the drawing that you don't care about, since your pens will probably leak through.
- Don't use your inking pens to color—you will destroy them, and will probably go mad coloring with a tiny nib.
- Rotate your work to fill in sections as needed.
- Use a tissue or paper to protect the rest of the work from smearing.
- There are no real rules here – use whatever materials for coloring you like, and color in any way you like. Just don't cross the lines. If you cross the lines, the whole basis of western civilization will come crumbling down. Probably.

Coloring is also really relaxing, which is probably why there are now so many adult coloring books on the market. Much better to create your own artwork to color!



*Figure 45 - Pretty colors*

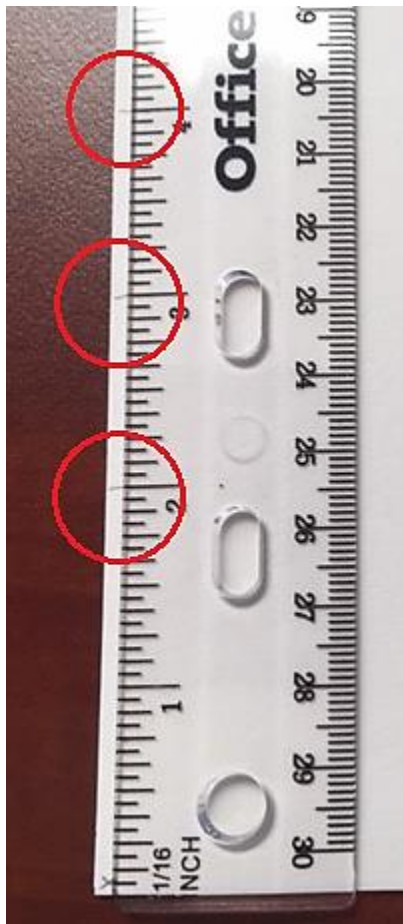
### Working without a net

Working on graph paper saves time and makes it much easier to get your points and lines in the right spot. Unless you are planning on tracing your design onto another piece of work though, it kind of ruins the final look of your work. Graph paper also limits you to a specific size and ratio.

If you want to work on regular paper, you simply need to create some of the framework that was previously provided by the graph paper.

### Creating your cells

You can use any paper you like, but I happen to be working with art paper, which is 9"x12". The first step is to measure and mark the location for your vertical cells:



This is the left edge of the paper. Just line up your ruler, and put a small hash mark where you want your lines. Since our cells are going to be 1", I've put hash marks at 2", 3" and 4". The 2" is arbitrary – I decided to put my design two inches from the bottom of the page.

By the way, note that I've put a small little *x* in the corner of the page. I do this so that I always know which edges to measure from. You always want to do all your measurements from the same two edges on your page.

This matters because you can't really trust paper to be exactly the measurement you expect. For example, on my 9"x12" paper, the paper is actually about  $8\frac{15}{16}$ " x  $11\frac{31}{32}$ ". If I measured different things from different edges, everything would be a little bit off.

*Figure 1 - Marking cells on left edge*



Next step is to draw the matching marks on the other edge (the right edge) of the paper.

The process is the same—measure up from the bottom edge of the paper, and put hashmarks at 2", 3" and 4".

Now that we know where our horizontal lines will go, we need to figure out the location for our vertical lines. We know that we want nine cells (since we are creating the same image as in the previous section), and it would be nice if the design was centered horizontally on the page. The formula for this is pretty simple:

$$\frac{\text{Width of page}}{2} - \frac{\text{Width of design}}{2}$$

Or

$$\frac{12}{2} - \frac{9}{2} = 6 - 4\frac{1}{2} = 1\frac{1}{2}$$

Which means that our first cell will be 1½" from the left edge, and the last cell will end 1½" from the right edge.

Position your ruler against the first hash marks, and put your first hash at 1½", and then add in hashes every 1" until you have got all 9 nine marks in place (it will be pretty obvious, since you will be about 1½" from the other edge of the page).

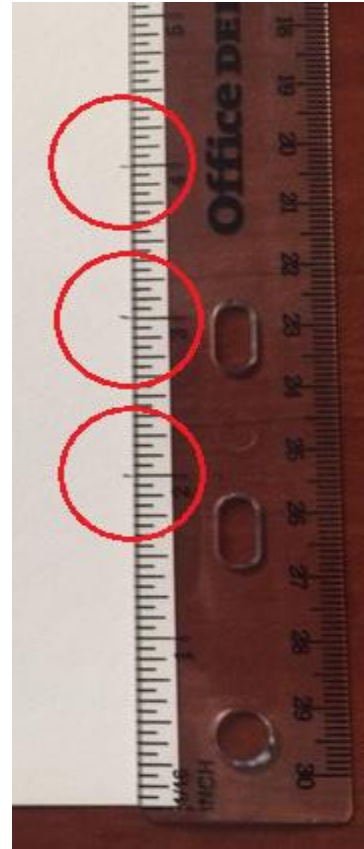


Figure 2 - Marking the right edge



Figure 3 - Adding horizontal cell hashes

While you have the ruler in position, go ahead and draw a line between the first and last hashmark. Without the ruler in the way, it should now look like this:

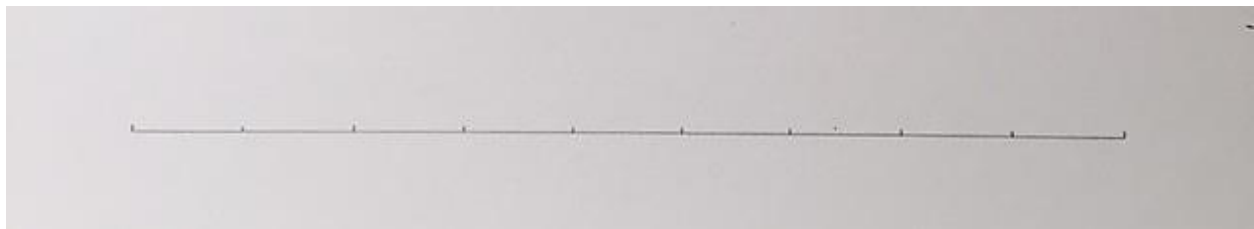
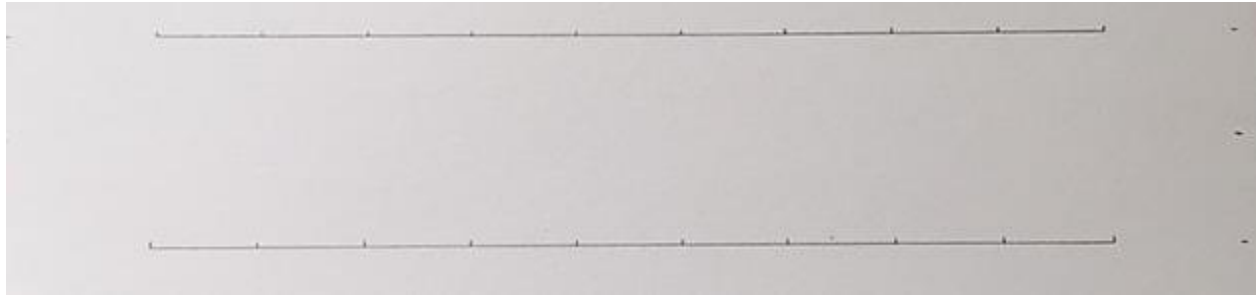


Figure 4 - Bottom line without ruler

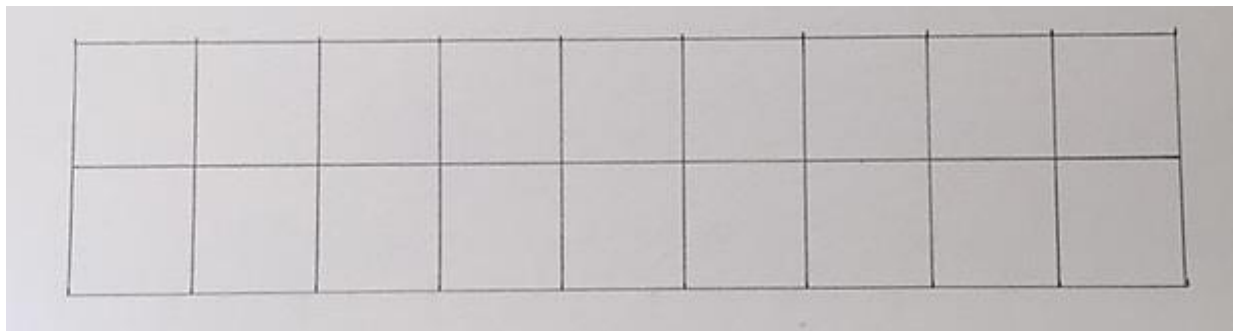


Now, repeat the process for the top line (the one at 4''):



*Figure 5 - Top and Bottom lines*

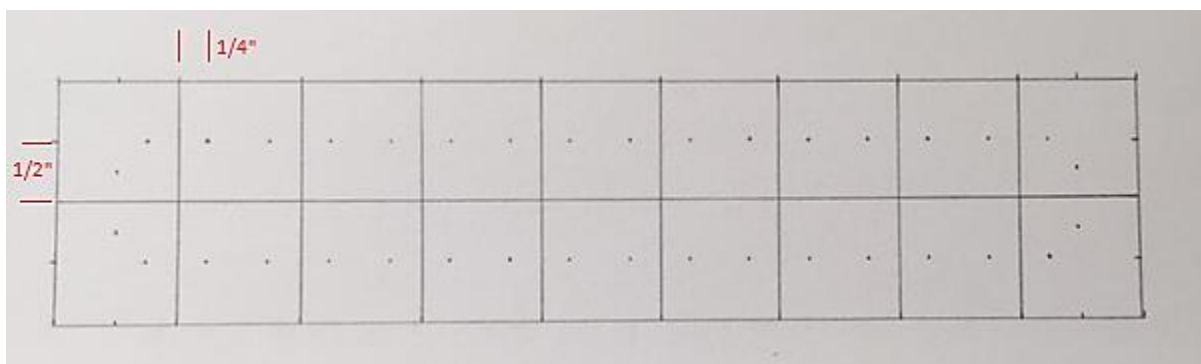
Now, just go ahead and draw in all of your vertical lines between your hashmarks. Then, draw in the center horizontal line to complete all of your cells:



*Figure 6 - All the cells*

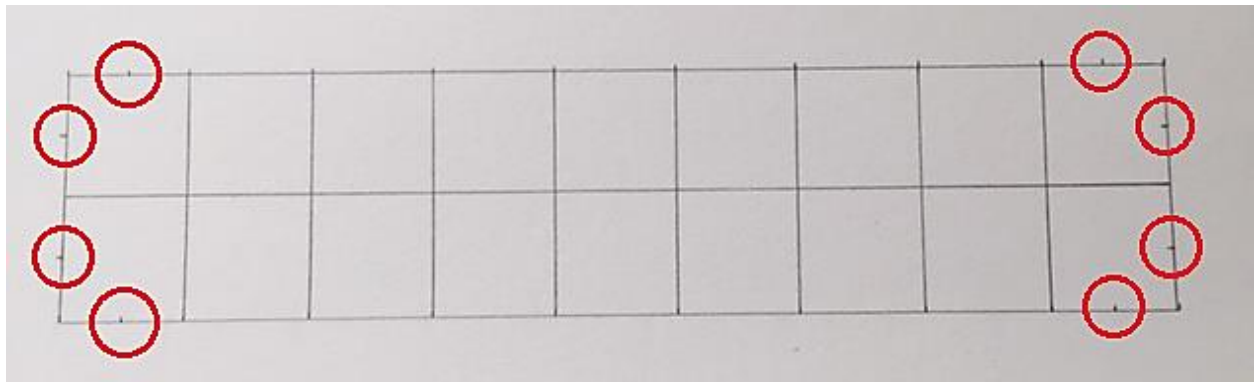
### Adding in quarter points

The next step is to add in your quarter points. Since we don't have built-in spots, we'll need to measure, but it isn't too tricky. If you recall from the earlier section, the quarter points are placed  $\frac{1}{4}$  of a cell on either side of our external lines, but they are centered in the cell. In our example, the points will be  $\frac{1}{2}$ " vertically within each cell, and  $\frac{1}{4}$ " away horizontally from each internal cell division. A picture is worth a thousand words, so here is what we are shooting for:



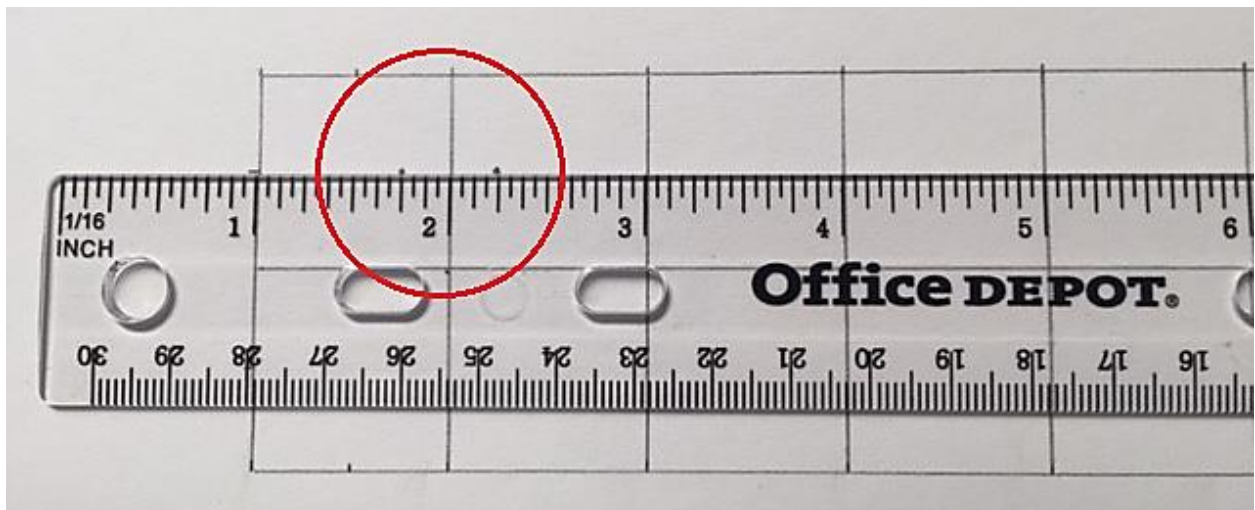
*Figure 7 - Measuring the quarter-points*

To get started, use your ruler to mark the  $\frac{1}{2}$ " points on the left and right edges, and also at the top and bottom of the left-most and right-most cells:



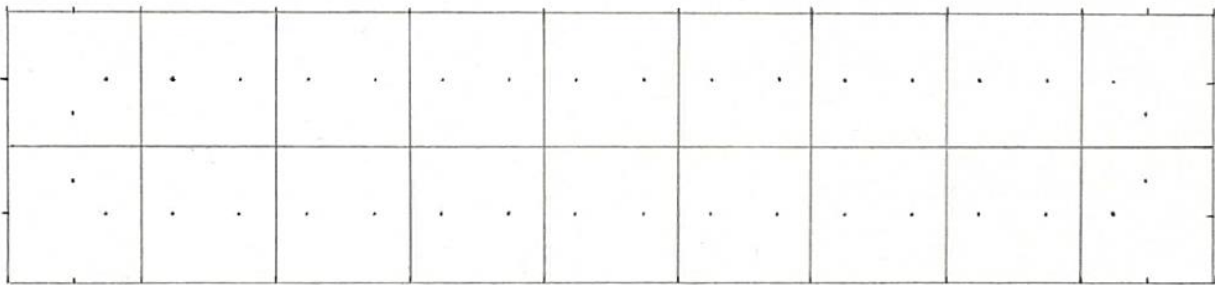
*Figure 8 - Dividing the outside cells in half*

Note that, if you really want to, you can draw the line in here, but later on it will just get in the way. All you really need to do is lay your ruler between the hashmarks, and then mark in your quarter points on either side of each internal line:



*Figure 9 - First quarter points*

Then just add in the rest of your quarter points all the way along, then move to the bottom, and the two sides. Once you are done, it should look like this:

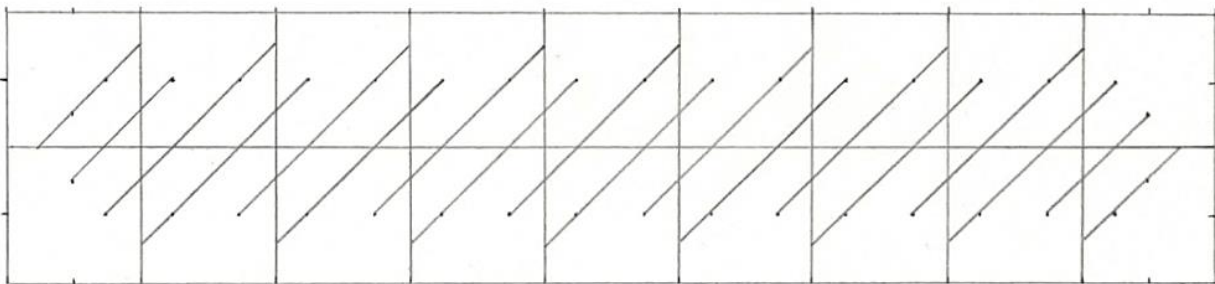


*Figure 10 - All the quarter points added*

### Finishing the design

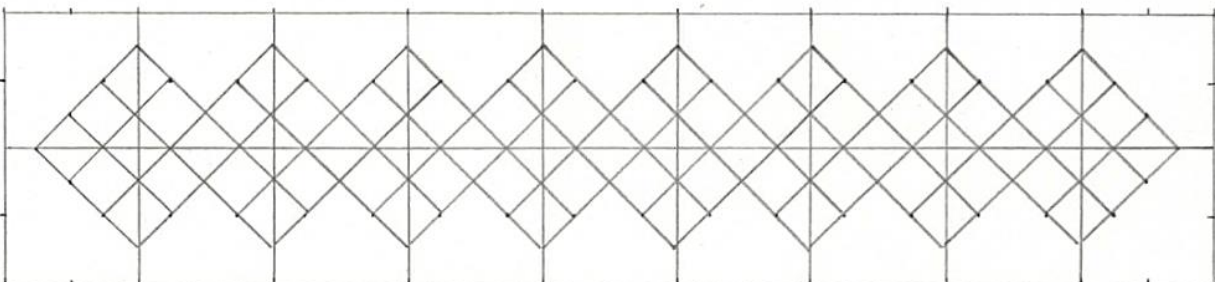
From this point forward, the process is the same as with the graph paper. I'll run through it again, though (briefly) to make everything clear, and to point out some minor issues.

Connecting the dots is the next step. I've gone ahead and combined the connect-the-dots and the extending-the-lines steps, as previously described:



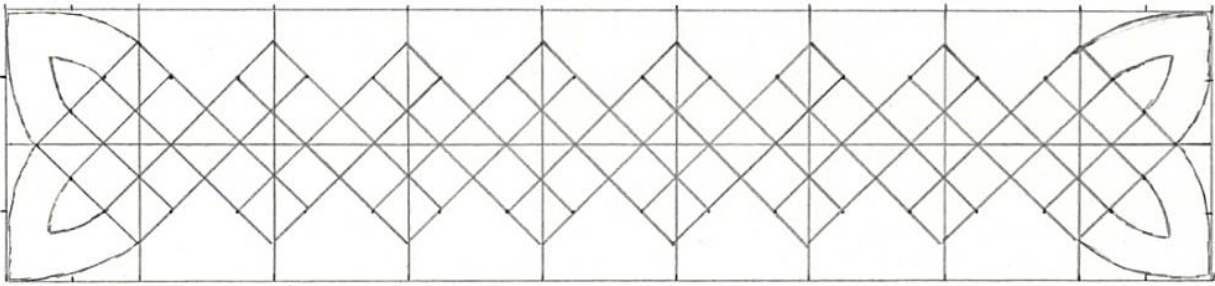
*Figure 11 - Connecting the dots and extending the lines, one direction*

And then do the same thing in the other direction:



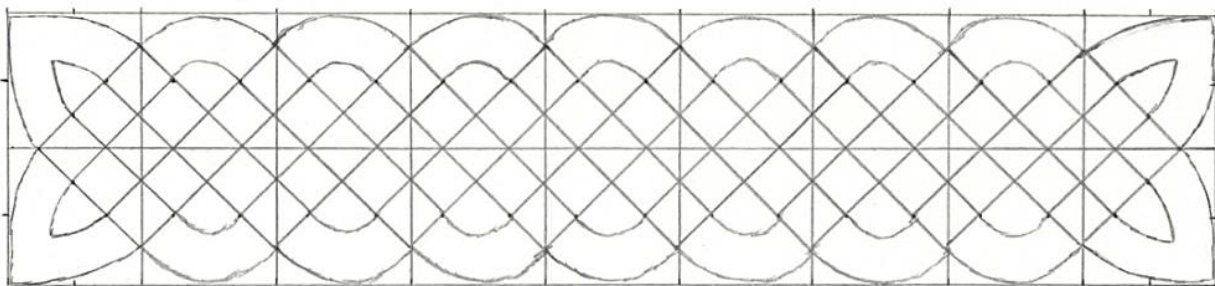
*Figure 12 - Adding in the diagonals the other way*

Next draw in the corners:



*Figure 13 - Adding in corners*

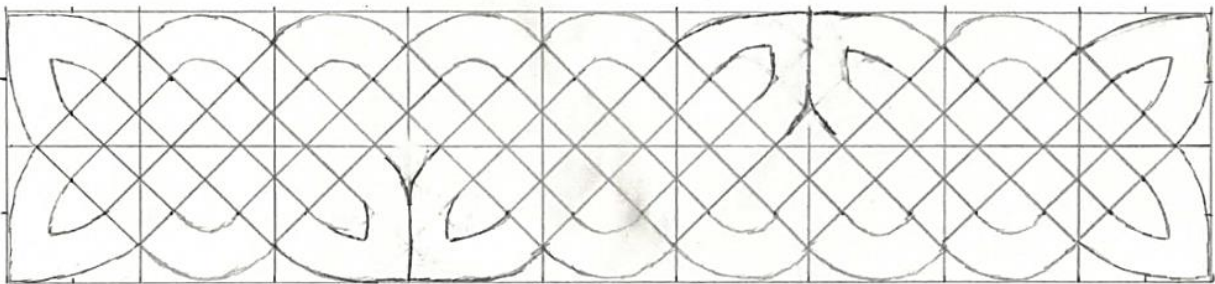
And the curves:



*Figure 14 - Adding in the curves*

I should mention here that it is a little bit harder to draw the curves without the help of the graph-paper. Don't worry if your curves are a little bit off at this point—you can fix them when you ink in the design.

The next step is to add in the breaks in the design:

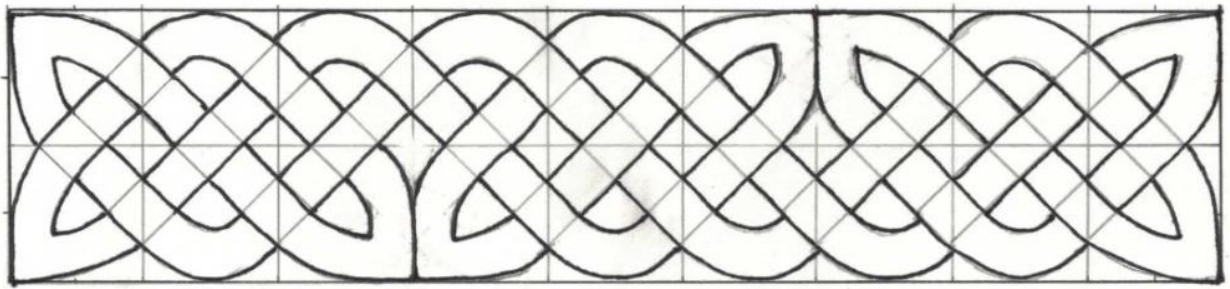


*Figure 15 - Breaking the design*

Refer back to the graph-paper section if you have trouble with this (or any of the steps).

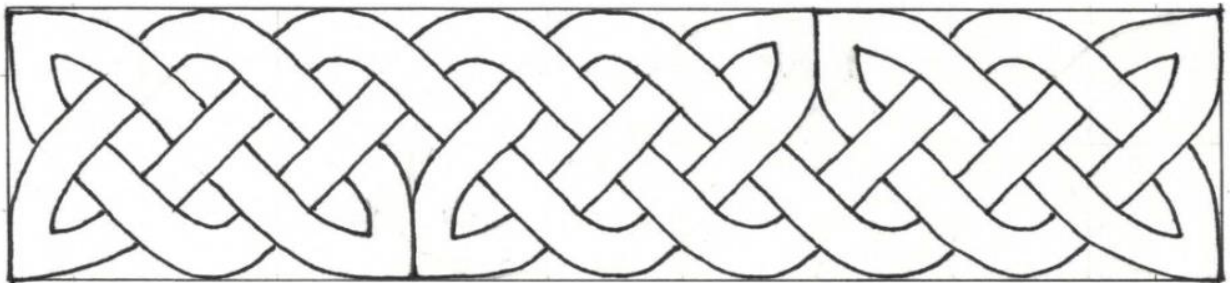


We are now ready to ink in the design:



*Figure 16 - Inking in the design*

Note that I also inked in the border around the design. You can now erase all of the setup lines:



*Figure 17 - Erase the setup lines*

Don't forget to erase the hash marks on the edge of your page!

We are now done! We have the full design, but without that annoying graph paper to ruin everything. Feel free to color to taste:



*Figure 18 - Green is pretty!*

## **Conclusion**

Over the course of the last sections, I've spent a lot of time emphasizing how to draw a very specific knotwork pattern. Part of the reason for this is to over-explain the areas of the process where I have seen students stumble—although I will say that the majority of students have no trouble with the process, and will probably be able to happily skip a lot of the text.

As I mentioned at the start, once you have mastered this much of the process, you have all the basic skills you will need to draw a significant number of other patterns and designs. It is my intent to write two more parts. In Part 2, I intend to cover other patterns and different treatments of the cords. In Part 3, I will cover different shapes, such as circles, tori and triangles, as well as doing full borders.

## **References**

There are a number of works from which I have learned from or referenced over the years. These are the major ones:

- Celtic Art: The Methods of Construction, *George Bain*
- Celtic Knotwork, *Iain Bain*
- The Celtic Design Book (and many more), *Aidan Meehan*
- Celtic Art in Pagan & Christian Times, *J. Romilly Allen*
- Book of Durrow, *Trinity College*
- Book of Kells, *Trinity College*
- Lindisfarne Gospels, *British Library*