

# **Chapter 3**

## **CHARTING ON PAPER**

Given the size of this book, you probably won't believe me when I say I'm colossally lazy. But it's true. That trait would dictate completely how I would chart on paper, because I would do everything possible to minimize how much I had to actually draw. Let me describe my strategy to give you a starting point for developing your own methods.

### **Minimizing How Much We Draw**

Since knitting is organized as stitches and rows, I think the best paper for charting is graph paper. We could of course chart on loose leaf or even unlined printer paper, but those types of paper will require tons more actual drawing.

If we draw charts on graph paper, **we can let each grid cell represent a stitch**. That means we don't have to make a bazillion little boxes by drawing a bazillion horizontal and vertical lines ourselves. See? Lazy!

Since each grid cell represents one stitch, each row of grid cells represents a single row of knitting. One sheet of graph paper represents lots of stitches and rows from the get-go.

And while I know one person who did his college accounting homework in **pen**, we should probably use a pencil to draw up knitting charts, which lets us make changes should we—*cough*—miscount grid cells, misinterpret the written-out instructions, or otherwise serendipitously create a whole new pattern while trying to chart the one in front of us.

Once we've completed the chart and checked that it's accurate, we always have the option to make a final copy in pen on a fresh sheet of graph paper. Or we can simply mark with a pen on top of the pencil, then erase all the pencil marks or just those that still show.<sup>1</sup>

### ***Knit Stitches***

If we use the simplest possible symbol for knit stitches, an empty grid cell, then our sheet of graph paper represents an awful lot of good old stockinette, and we haven't even drawn anything yet. See? Lazy!

### ***Purl Stitches***

The next lazy idea is to represent a purl stitch by starting with a knit symbol (which we didn't have to draw ourselves), then adding some kind of mark.

We could use a horizontal line, which for some of us suggests a purl bump's mainly hori-

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<sup>1</sup> We've filled out our tax forms this way for years now, because one year we wrote numbers in the wrong places while transferring them to pristine forms.

zontal appearance (the bold ridges in garter stitch are due entirely to the rows of public-side purls). In this book, we've been using a dot, because it's more or less impossible to confuse a dot with one of the grid cell's four sides.

So we chart purl stitches by putting our preferred mark in each grid cell that needs to be a public-side purl.

## Small Charts on Big Paper

If our project chart doesn't need the full sheet of grid cells, then we need to show which cells represent the stitches in our project. If we know from the instructions how many stitches and rows we need, then we just draw lines around that many columns and rows of grid cells.

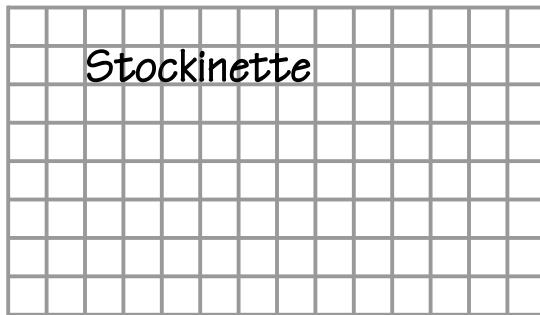
So to chart the stockinette swatch from chapter 1, the only lines we draw are the ones that enclose an area that's ten columns wide and four rows tall. That's *it*. Four lines drawn, and *poof!* We charted forty stitches of stockinette in under five seconds! See? Lazy!

Let's chart several of the basic fabrics step by step.<sup>2</sup>

## Stockinette

We just described the stockinette chart as four boundary lines, but let's see exactly how we arrive at that summary.

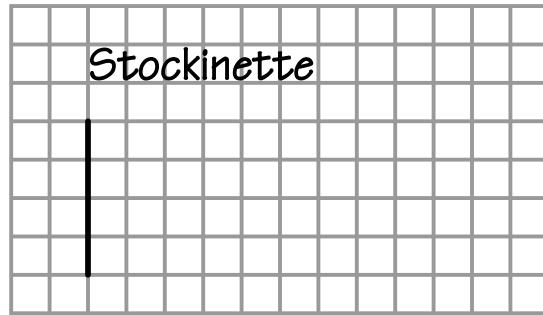
Leaving some space at the left side of the paper, where I know I'll want to put the private-side row numbers, I write the project or pattern's name near the upper left corner of the page.



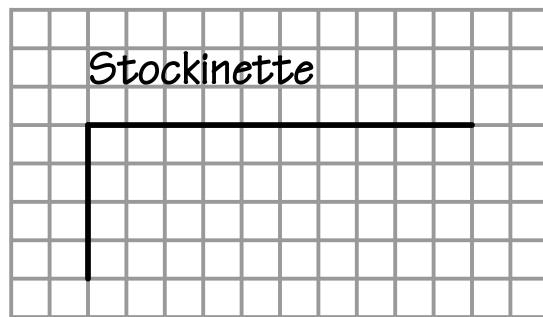
I draw the left boundary, making it four rows tall (drawn line number one) to match the number of rows specified in the written-out instructions.

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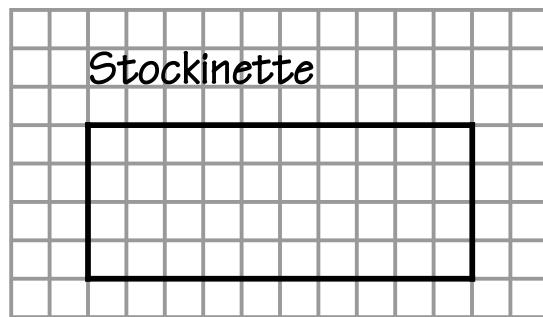
<sup>2</sup> Clearly I created all these “hand-drawn” charts in the computer. They wouldn’t be legible otherwise.



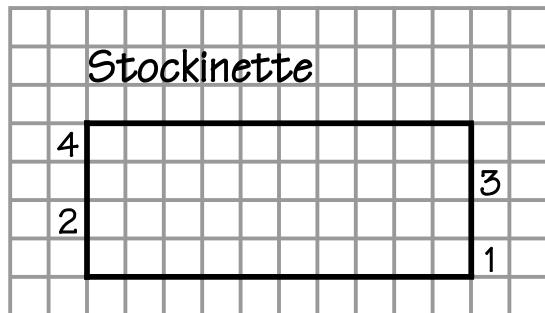
I draw the top boundary, making it ten columns wide, since the swatch is ten stitches wide (drawn line number two).



I then draw matching right and bottom boundaries to complete the rectangle that represents the edges of the swatch (drawn lines three and four).



I add the row numbers to finish off the chart, making sure that on both vertical edges there's a blank cell in between them to alternate between public- and private-side rows.



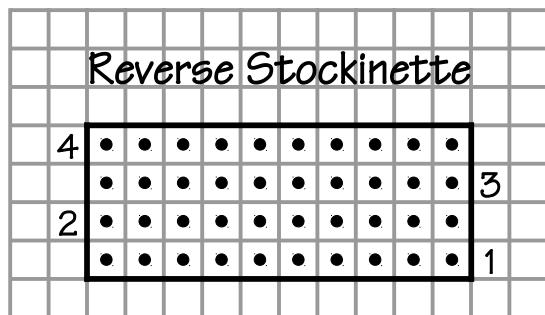
That's it. The name, four lines, and four numbers. See? Lazy!

MIKs, remember that you **draw** charts as described throughout this chapter; the changes come only when you **work** from them with needles and yarn.

## Reverse Stockinette

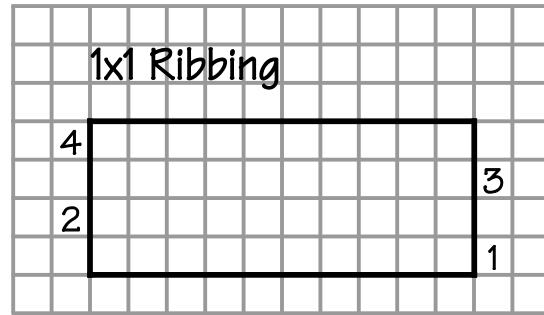
The reverse stockinette chart is almost as easy. Since it's the same number of stitches and rows as the stockinette chart, I do all the same steps as before, except that I try to remember to write the correct swatch name.

Reverse stockinette is the private side of stockinette, so each grid cell within the four boundary lines gets our purl mark.



## 1x1 Ribbing

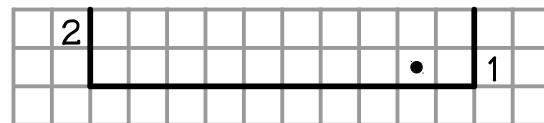
This chart will begin exactly the same way as the stockinette chart: swatch name, four drawn lines surrounding ten columns and four rows, and four row numbers.



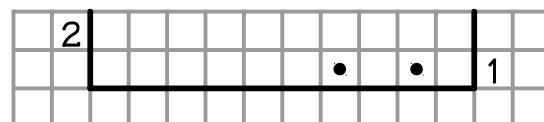
Now we have to switch to purls some of the knits we get for free from the grid itself, which means we only need to put our purl mark in the grid cells where we make public-side purls in needles and yarn.

Since we'll read the written-out instructions in the normal direction, left to right, we'll chart the public-side rows from right to left, because of our charting rules of reversal. Charting public-side rows this way also means we automagically chart according to the un-written assumption that public-side rows are worked from right to left.

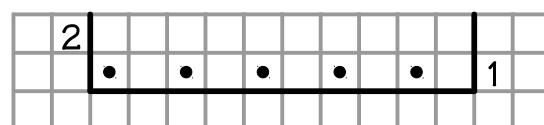
Row one starts with a knit, so we leave unmarked the lower right cell inside our rectangle. We move to the grid cell to its left, which will be a purl, so we put our purl mark in it.



The next cell to the left will be a knit, so we leave it empty. The fourth stitch on the row is a purl, so we put our purl mark in the fourth grid cell from the right.

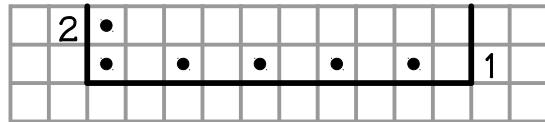


As we move across the row, we put the purl mark in cells six, eight, and ten (counting from the right because it's a public-side row).

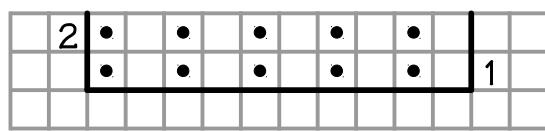


For row two, the instructions tell us to work K1–P1 all the way across. Since we have to swap knits and purls on private-side rows (because the chart shows us what all the stitches look like from the public side), and because we chart private-side rows from left to right, we

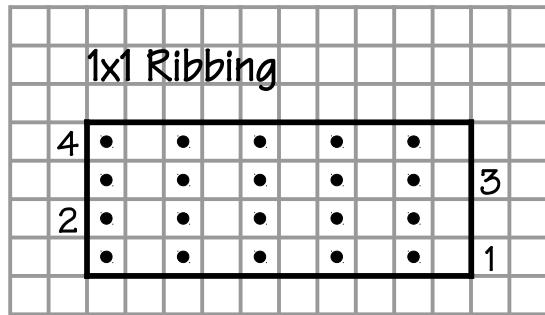
have to put a purl mark in the first grid cell from the left, the one right up against the row number on row two.



The second stitch in the written-out instructions is a purl in needles and yarn, but we have to show it as a knit in the chart. That means we skip over that stitch's grid cell. We mark as purls the third, fifth, seventh, and ninth cells (counting from the left because it's a private-side row) to finish charting row two.



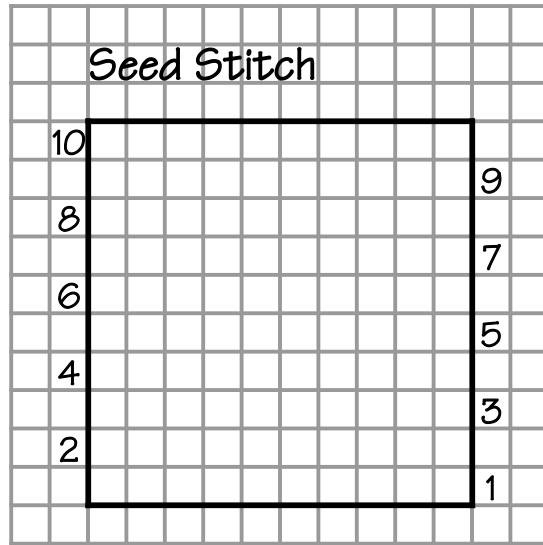
Rows three and four are charted exactly the same way as rows one and two.



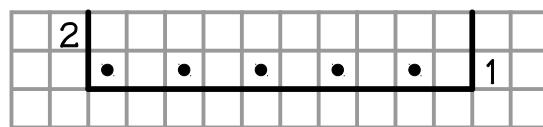
Ribbing always stacks knits on knits and purls on purls, and that's what the chart shows.

## Seed Stitch

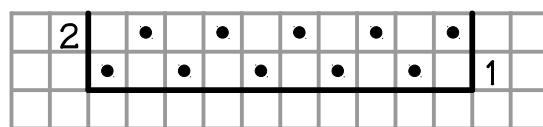
The first three swatches all happened to be the same size, so let's draw up one of the bigger swatches. The seed stitch swatch is ten stitches wide and ten rows tall, so its chart needs boundary lines that enclose a ten-by-ten area of grid cells. To minimize the number of intermediate charts we have to show here in the book, we'll add the row numbers at the same time we draw the swatch's boundaries.



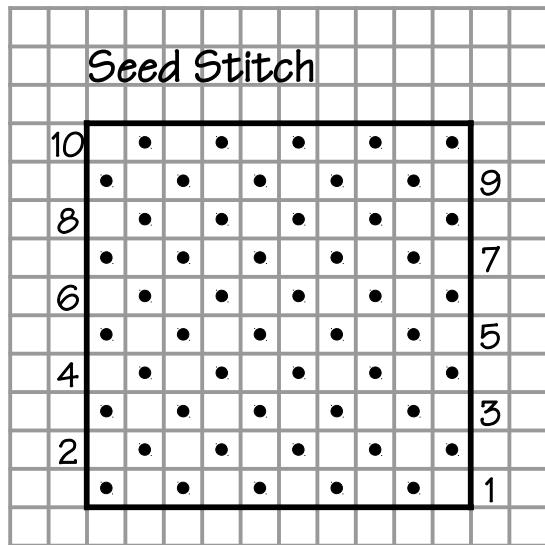
Now we start adding our purl marks. We know that the first row of 1x1 ribbing and the first row of seed stitch are identical as long as both rows have the same number of stitches and start with the same stitch. Since our two swatches match in that regard, we know we put purl marks in the second, fourth, six, eighth, and tenth cells counting from the right in the public-side row one (because we must abide by the assumption that public-side rows are worked from right to left).



For the private-side row when we work back with needles and yarn, when the stitch on the source needle is a knit, we have to purl it. If the stitch is a purl, we knit it. This switcheroo is exactly the opposite from how we chart (and work) ribbing. We can take that knowledge straight to the chart, so technically, we don't even have to look at row two's written-out instructions. (If we did, though, we would get the exact same result.) So we start the checkerboard of purls, by moving them over one column compared to row one.



Since all the public-side rows are the same as row one and all the private-side rows are the same as row two, we verify that we have drawn rows one and two correctly, then we can just copy their patterns of purl marks up the rest of the chart.



### ***To Mark or Not to Mark (a Cell): That Is the Question***

So to draw charts for our basic fabrics, we let the grid itself start us off with all knit stitches. Since we know how many stitches and rows we'll work in each swatch, we can draw just four lines to make a rectangle the width of the number of stitches and the height of the number of rows.

We add the row numbers, putting the public-side numbers upward along the right boundary and the private-side row numbers upward along the left boundary.

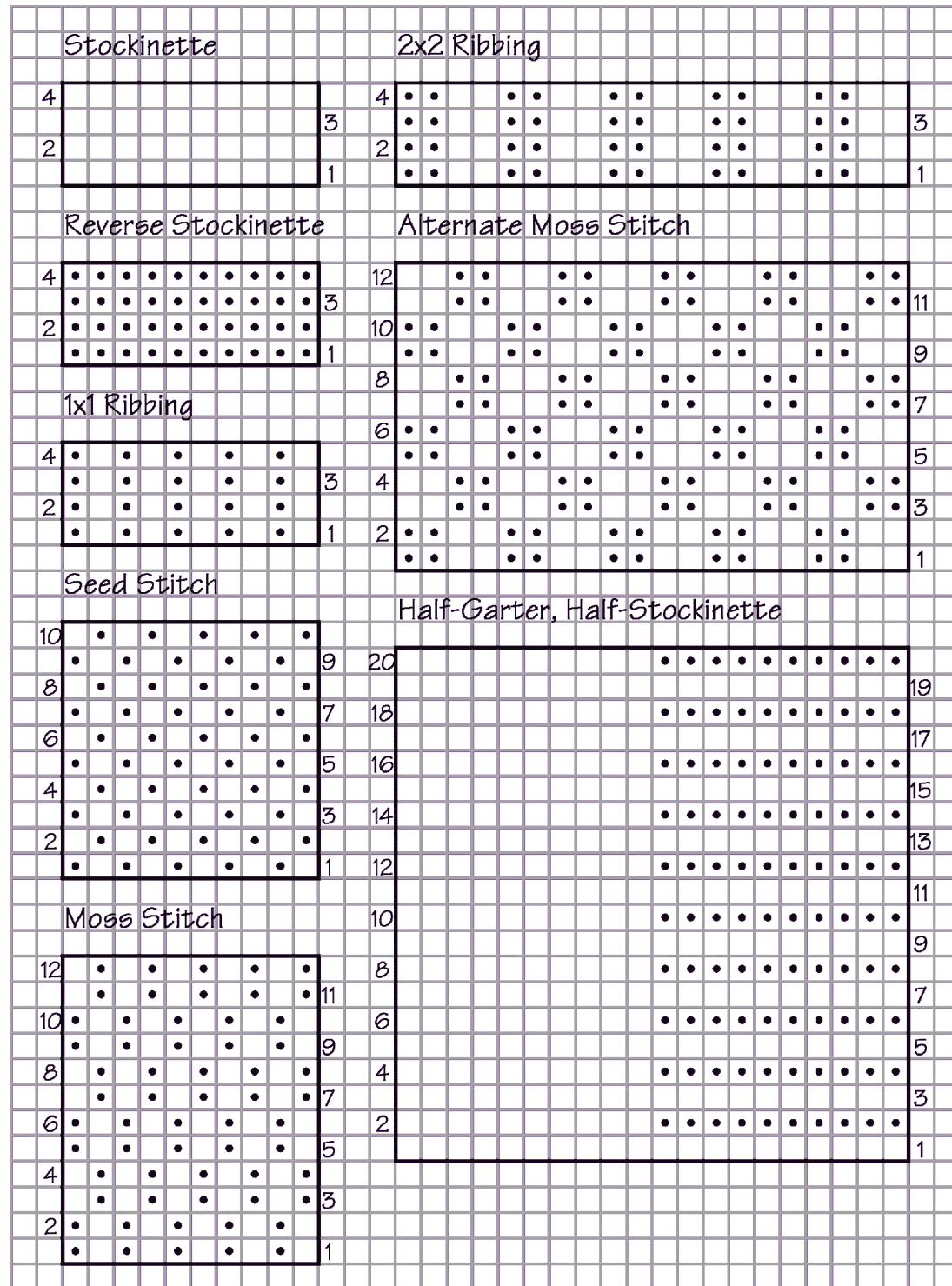
As we read the instructions for each public-side row, we start at the right edge of the rectangle. If we have to knit a stitch, we skip a grid cell. If we have to purl it, we add our purl mark. We continue skipping or marking all the way across from right to left.

For the private-side rows, we start at the left edge of the rectangle. If the instructions say to purl a stitch, we have to show it as a knit in the chart, so we skip to the next grid cell to the right. If the instructions say to knit a stitch, we have to show it as a purl in the chart, so we make our purl mark. We either mark or skip cells all the way across from left to right.

## **The Basic Fabrics' Charts**

If we squeeze them together a bit, we can fit all of chapter one's charts on one side of a single sheet of graph paper.

All knitters, traditional and mirror-image, will construct from the written-out instructions the charts exactly as shown here. MIKs make minor modifications in how they work from them.



## Selecting Graph Paper

If we use graph paper from the office supply store, the grid cells will be square. But we rarely have square stitches; usually our stitches are wider than they're tall. We see that in the typical gauge we use for stockinette in worsted weight yarn: five stitches and seven rows per inch. Each stitch will therefore be 0.2 inches wide (one inch divided by five stitches per inch) and 0.143 inches tall (one inch divided by seven rows per inch). Since we have more rows per inch than stitches, then if we draw a project chart on square-cell graph paper, the chart on paper will be taller than the project as worked up in yarn.

One major advantage of using square-cell graph paper is that we have a bit more space in each cell to draw in whatever marks we need. This advantage is particularly helpful when we're charting written-out instructions for an **existing** design. But if we're **creating** a design, then square-cell graph paper is only going to cause heartache.

When we're designing, we **must** work with proportional grid paper, definitely for images and possibly for geometric shapes. Proportional grid paper will have rectangular cells; the cell width is based on our stitch gauge, and the cell height is based on our row gauge. Ignoring the difference in our gauges will mean our designed image or shape when worked up in yarn will be too short for its width; it will be squashed vertically.

Fortunately, we can make our own proportional grid paper in several ways.

## Using Knitter's Graph Paper

Knitter's graph paper uses our stitch and row gauges to determine how big to make the cells. They wind up rectangular instead of square, because nearly all of us need grid cells that are wider than they are tall.

[This website](#) will create knitter's graph paper with the exact grid cell dimensions we need. We put in our stitch and row gauges (note that they must be measured over four inches, not over one inch), then click the Create button. The website will generate a one-page PDF filled completely with grid cells sized to match our gauges.

So for our example stockinette gauges of five stitches and seven rows per inch, we put "20" in the Sts box and "28" in the Rows box (the values over four inches). The PDF will have forty stitches and seventy-four rows.

See the part four chapter "More Charting Tips" to learn how to put more columns and rows in the PDF while maintaining the proper proportions between cell width and height.

## Dark Squares Help Us Count

The PDF uses a thicker line after each interval of the number of stitches and rows we put in

the boxes. So for our sample numbers, the vertical grid lines will be thicker every twenty columns, and the horizontal grid lines will be thicker every twenty-eight rows. (The PDF starts counting at the lower left corner.)

Normally, those darker grid lines enclose a square of knitting that in yarn measures four inches by four inches. At the very least, those larger squares help us count more accurately when we're charting. But we can play some tricks with the numbers to get more dark squares, as explained in the part four chapter "More Charting Tips."

The website also allows us to specify the thicknesses of both the regular and the thicker grid lines. Some of us might like to put a slightly higher number in the Thin Line box to make them easier to see.

If we don't want those dark squares in the chart (some of us might find them distracting rather than helpful), we set the Thick Line value to be the same as the Thin Line value.

## ***Making a Square-Cell Grid***

We can also use the website to make grid paper with square cells by putting the same number in both the Sts and Rows boxes, for those charting emergencies when we've run out of ordinary graph paper and the office supply store isn't open.

## ***Grid Line Color***

Graph paper from the office supply store and color-printed knitter's graph paper from the website both have light blue grid lines.

That color is dark enough that we can let the cell borders form the four sides of each stitch symbol, but it's not so dark that we can't tell the difference between those base grid lines and any lines or marks we add with pencil.

If we want to make our own grid paper, we'll need to experiment with different pen colors (if we draw by hand) or different color settings (if we draw in the computer). We should strive for a clearly obvious difference between the grid line color and the pencil marks we'll draw. How clear? I'd want enough of a difference that I can tell what's what with just a quick glance. We shouldn't have to stare intently at the chart to figure out if something is a base grid line or an actual symbol mark. (So we shouldn't use any dark color for the grid lines.)

## ***Warning: Blue Grid Lines May Not Photocopy***

Let's imagine we've charted a lovely new stitch pattern we created out of thin air. We take it to knit night and everybody loves it. When we put it in the yarn shop's copier, the light blue

grid lines (whether we charted on office store graph paper or color-printed knitter's graph paper) don't show up. The only things on the copies are the pencil marks we added.<sup>3</sup>

If we want to make sure our charts' grid lines will always photocopy, we need to use some other grid line color. If we print the website's PDF on a black-and-white printer (or set a color printer to print in black and white), the lines will all be gray, but even some grays may not photocopy well, so we should make a test photocopy of our grid before we start charting, just in case we ever need to put the chart in a copier.

## ***Creating Our Own Grid Paper***

See the appendix "Designing by Charting" for details on making proportional grids two ways in a word processor: with a table or with lots of knit symbols.

## **Many Charts Aren't Rectangular**

Naturally, items like mitten fingertips and sock toes don't use simple rectangular charts, nor does shaping for most sweaters. We have to indicate in the chart that the rows get narrower or wider, as the case may be. And of course lots of projects aren't worked with only knits and purls.

As we progress through the rest of the basic knitting operations and look at different types of projects, we'll see the easy ways we chart other kinds of stitches and make adjustments for various kinds of shaping.

## **Charts in the Rest of the Book**

Because it's fairly time-consuming for me to make charts that appear to be drawn by hand, almost all the charts in the rest of the book will not have the background gray grid like those in this chapter.

So empty rectangles represent empty cells on grid paper and should be worked as public-side knits. If a rectangle contains a dot, that's the equivalent of a cell with the purl mark and should be worked as a public-side purl.

Some symbols need more than just a mark of some kind inside a single grid cell. Chapters that explain how we chart such symbols will include a section describing how we draw them when we're charting on paper. Further occurrences of such symbols will then be shown without the underlying grid, just like the knit and purl symbols.

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<sup>3</sup> If you want the gory details of why, check out the Wikipedia article "[Non-Photo Blue](#)."