

# DESIGNING IN 45°

By Susanna Lewis

Knitting a garment on the bias can be a most intriguing adventure. First, the fabric of the garment will drape and hang on the body in a different way from garments knit either vertically or sideways. Secondly, adding horizontally striped color or texture patterning will create flattering diagonals and chevrons across the garment. Thirdly, those fancy decreases you have collected for knitting beautiful raglans can be put to a new use, to decorate the midline of a garment shape. If you are interested in learning to convert a standard, vertically knit garment shape into one for bias knitting, read on. Or, you can skip to the start of the instructions for knitting the model sweater (p. 34) and come back to this part later!

The method of working described here allows you to convert any diagrammed shape from either vertical or sideways into diagonal in a very visual way, without the use of unusual mathematical formulas and mumbo jumbo. Although using the Magic Formula to determine the shaping of the selvages is certainly the most efficient way for those who are accustomed to using it, its logic often escapes the uninitiated, especially through the written word. The method I am showing you here, for the designing of the model raglan sweater, is very graphic and allows you to have full control for modifications and changes every step of the way, from the first measurement to the final bind-off.

**Materials.** **A.** Square gridded graph paper, 8 sq/in for adult size garments, 6 sq/in for children's sizes. **B.** Pencil and eraser. **C.** Ruler. **D.** Pocket calculator. **E.** A piece of tracing paper. **F.** 3:4 proportioned graph paper (3 sq wide = 4 sq high). **G.** Colored pencils that approximate the yarn colors you are using. **H.** The stitch and row gauge from your swatch (for this exercise the ratio must be 3:4; in stockinette, the measurement for 3 sts = the measurement for 4 rows).

To find out if your stitches and rows are in a 3:4 ratio, divide the stitches per inch (or 4") by 3, and the rows per inch (or 4") by 4. The two quotients should be the same number, or very close. For example, my swatch gauge is 5 sts, 6.75

rows = 1 inch. 5 divided by 3 = 1.66 and 6.75 divided by 4 = 1.69, not exact but close enough.

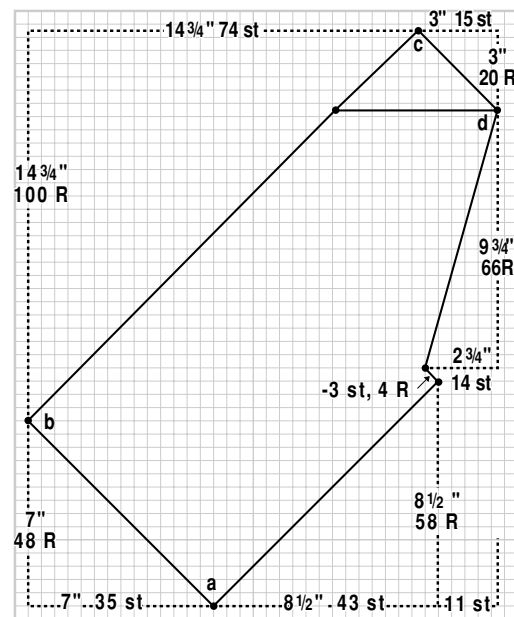
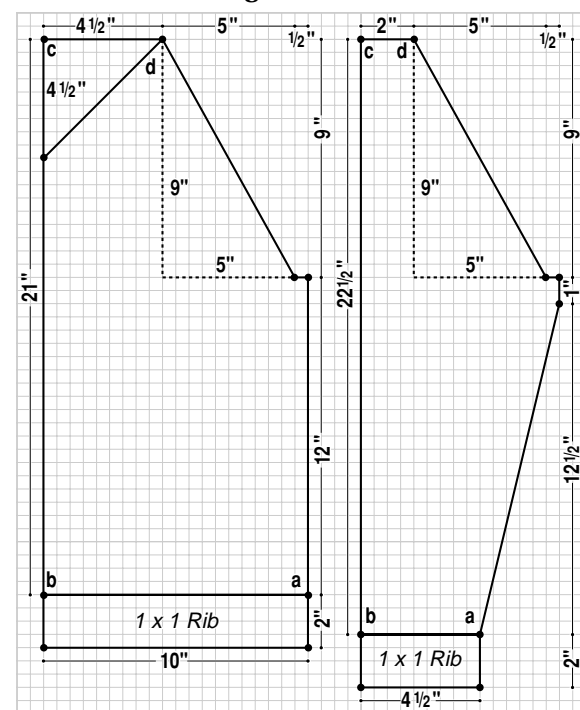
The square gridded paper is used to plan the shape and size of the garment pieces with their measurements and calculated stitches and rows. The proportioned graph paper is afterward used to show every knitted stitch and row in order to plan the increases and decreases around the edges of each garment shape, the colored pattern within it, and to have a complete chart from which to work. This makes the prospect of keeping track of a different shaping for each selvedge plus a color pattern, all at the same time, become a welcome adventure instead of a dreaded nightmare!

**Step 1.** Make an outline of each garment shape on a piece of square gridded paper. If you want the entire front of a sweater to be knit on the same diagonal for example, you must use the full width of the shape, with both armholes and neckline. Since I want to mirror the diagonal and patterning each side of the center on my sweater pieces, only half of each shape is required. When drawing the outline onto the grid, I allow 1 square to equal 1/2" (or 1 cm if working in metric), and round off all measurements to the nearest 1/4". This makes whole and half inches fall at the corners of the squares, and fourth and three-fourth inches in the middle of the squares — easy to see what you are doing. Place dots at each point where the outline changes direction. Write the measurements for each section of each garment piece, double checking that your numbers at the left and right of each piece add up to the same sum, as well as those at the top and bottom. Mark the points A-D as shown. Note that I was careful to make sure that the triangle which forms the raglan has exactly the same width and height dimensions on both pieces, which simplifies the calculations and color patterning later on. Additionally, the depth of the front neckline should equal the width, making the resulting diagonal forty-five degrees.

**b.** Lay the tracing paper over your diagrams and carefully trace all the points and lines of each shape, except those for the bottom ribs, which are knit separately. Mark the points A-D. You won't need the measurement numbers any more, but you'll have them for reference after the pieces are knitted.

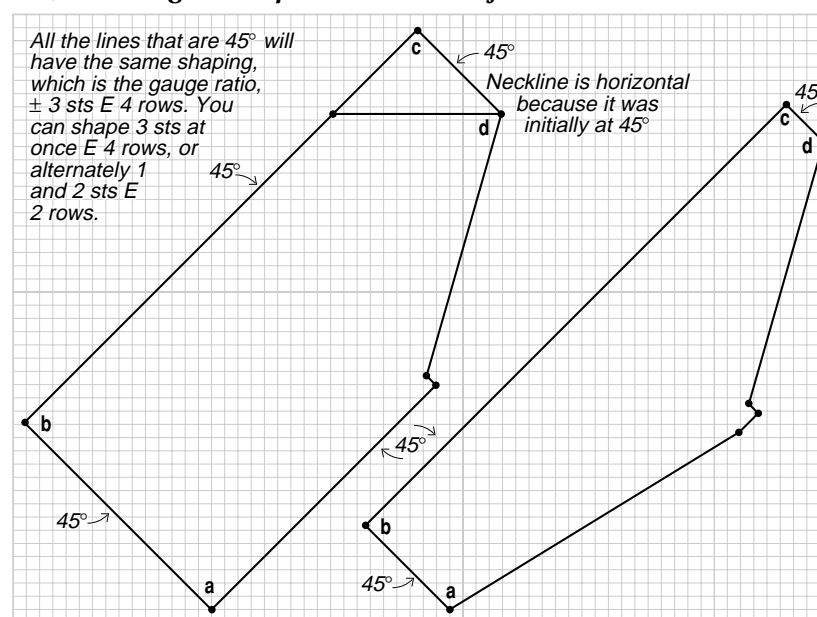
**Step 2.** Lay the tracing paper over a new

## 1. Raglan sweater pieces, diagrammed for vertical knitting



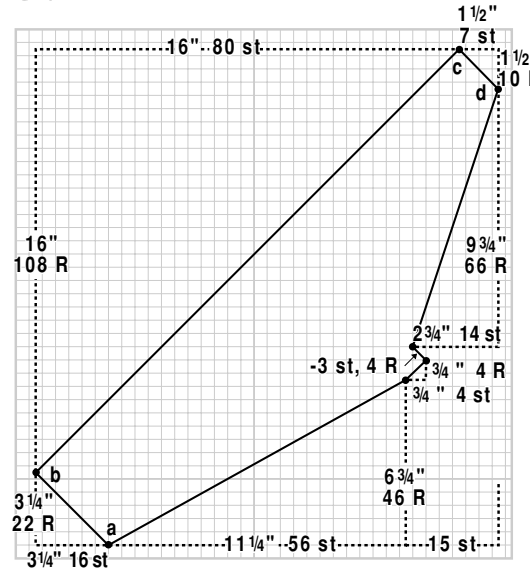
piece of graph paper. It is easiest if you cut the garment pieces apart and deal with one at a time. Do the Front/Back shape first. Place the point A at the corner of a grid square and rotate the shape to the right so that point B moves upward and point D downward. Stop the rotation when line AB is at a 45 degree angle to the grid, bisecting all the squares corner to corner. Lines BC and CD will also be at 45 degrees. The front neckline will be horizontal. On the grid, mark the new positions of all the points as you see them through the tracing paper, then connect them with ruled lines. Check your work by laying the new gridded shape over the original to make

## 2. Rotating the shapes so that most of the outline is 45°



1. Place point a at the corner of a grid square
2. Rotate the shape until line AB is 45°, bisecting all the squares corner to corner.

## 3. Converting the shapes to stitches and rows.



sure all the points and lines are the same (hold them against a window or over a light box). Now trace and draw the sleeve shape in the same way.

The garment pieces are rotated on point A instead of point B because the midline of each completed piece is to be decorated with a fancy decrease, and I want the color patterning to mirror in a V shape. If it were rotated on point B, the midline would then be increased instead of decreased, and the color patterning would mirror in an upside-down V. I am rotating to a 45° angle instead of some other angle because the 3:4 ratio of my swatch gauge indicates a shaping sequence of plus or minus 3 stitches

every 4 rows, which will automatically produce a 45° angle without any further calculation (if my swatch ratio was, say 2:3, the shaping sequence would be plus or minus 2 stitches every 3 rows to make a 45° angle, and I would use 2:3 proportioned graph paper to chart the final shape). As you can see from the diagram, the only lines which are not 45° are the raglan (same on both pieces) and the underarm side of the lower sleeve, and so their shapings will be different.

**Step 3.** Now to calculate the stitches and rows. To start, all the diagonal lines on the grid must become parts of right-angled triangles. This is easy, just connect each pair of adjacent dots with horizontal and vertical lines (dotted lines) until they intersect and form a right triangle. Count up the squares for each horizontal and vertical dotted line and convert the squares to inches (remember, one square = 1/2 inch). Mark each measurement (with " by each number) next to its line. You don't have to deal with the diagonal lines at all. Now, convert all the horizontal measurements to stitches and all the vertical measurements to rows.

Take your calculator and learn to use it efficiently: Enter the stitch gauge. Press the 'times' key twice (this puts the gauge and 'times' in memory). Enter one of your horizontal measurements and press the 'equals' key once. The result is the number of stitches for that measurement. Round it to an odd or even whole number and write it next to the measurement with 'sts' next to it. Without pressing the 'AC all clear' key, enter the next horizontal measurement and press the equals key. The result is that measurement in stitches. Round it and write it

down the same way. Enter the next horizontal measurement and equals key, and keep going until all the horizontal measurements are converted to stitches. Now, convert all the vertical measurements to rows. Do it the same way, but first press 'AC' to clear the stitch gauge. Now enter the row gauge, 'times' twice, the first vertical measurement, 'equals.' Round the result to an even whole number and write it next to the measurement with 'R' next to it. Enter the next measurement, 'equals,' and so on until all the vertical measurements are done. Now, double check that all the stitches at the top and bottom of the grid add up to the same sum, and that all the rows each side of the grid add up the same. You might have to make some adjustments up or down 1 stitch or 2 rows, since you have been rounding off your numbers both up and down.

**Step 4.** (See charts pp. 59-60) Plot sts and rows on proportioned graph paper. One square will equal one st and one row. First, position points A-D on their respective sts and rows. Mark the square for A first, somewhere near the bottom of the grid. Place B by counting leftward and upwards the required squares for the intervening stitches and rows. Plot all remaining points the same way. Connect the points with lightly-drawn ruled diagonal lines. Follow each ruled line from one point to the next and make a stair step outline around the squares for the shapings. Make each step be at least 2 squares in height (grid rows) so that the shapings will be at least every other row, and either odd or even number in width (grid sts). In this garment, since the shaping for the lower part of each piece is made by short rows, I was careful to make all the steps be 2 rows in height, and placed all the L edge shaping steps on even-numbered grid rows, and all R edge shaping steps on odd-numbered grid rows. I continued the L and R steps even into the raglan, as it is easier to knit if you have to look at only one side of the chart and shape on only one side of the knitting, at a time. You will find that on all the diagonals that are at 45°, such as lines AB, BC, and CD, the shapings will step every 2 grid rows, alternately by 1 grid st and 2 grid sts. This follows the 3:4 ratio of the gauge and your proportioned graph paper: inc or dec 3 sts every 4 rows. To make the decorative dec on the midlines for this sweater, the shapings have been grouped together into the 3 st, 4 row steps, to make them more dramatic, so that 3 sts are dec all at once, E 4 rows. It is a full-fashioned dec, on sts 3-5 in from the edge, causing sts 1-2 to be on the straight grain instead of the bias. This in turn, creates a negative bias at the lower edge, which is the reason why point B is temporarily extended by an extra 3 sts. The 3 sts do not stay very long, they are dec one at a time E 2 rows, on the edge of the knitting.

