Math for Garter Stitch Circle

Worked flat (all rows knitted), then seamed. If working in the round, alternate knit and purl rounds, placing inc rnds on RS's

Slices = 8 (used in many patterns)

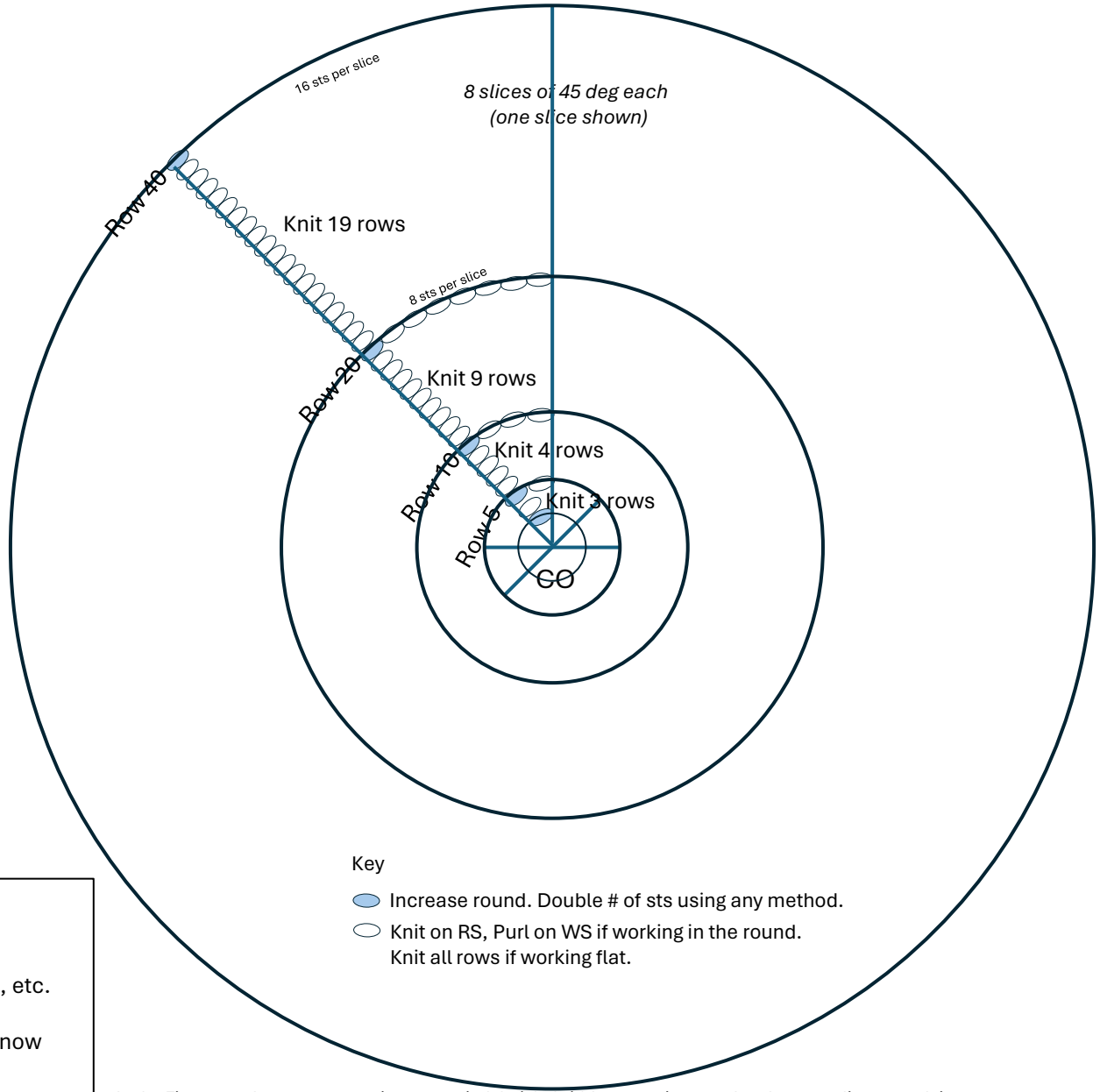
Gauge: For Garter Stitch, 2*h=w; where h is height of stitch and w is the width.
Example: w is .25", therefore h will be .125" which is consistent with garter stitch where 1 stitch width equals 2 rows of height.

If we start with 8 sts, the double of that is 16 sts.
Circumference (c) in terms of w is: 16 * w
Radius (r) in terms of c is: c = 2*pi*r; r = c/(pi*2)
r for 16 sts is therefore: r = (16 * w)/(pi*2)
using example of 16 sts and st width of .25"; r = (16 sts * .25"/st)/(3.142*2) = 4/6.284 = .63"
# of rows at which we have 16 sts is radius in " divided by row gauge = .63"/(.125"/row) = 5 rows
For 8 sts (which is the # we are going to generate or end with): (8 sts * .25"/st)/3.142*2)=4/6.28 = .315; .315/(.125"/row) =~ 2 rows
For 32 sts: (32 sts * .25"/st)/(3.142*2)= 8/6.28 = 1.26; 1.26/(.125"/row)= 10 rows
For 64 sts: (64 sts * .25"/st)/(3.142*2) = 16/6.28 = 2.52; 2.52/(.125"/row)= 20 rows
For 128 sts: (128 sts * .25"/st)/(3.142*2) = 32/6.28 = 5.04; 5.04/(.125"/row)= 40 rows

8 sts | at row/row 2 (we will generate 8 sts if working center-out)
16 sts | at row/row 5
32 sts | at row/row 10
64 sts | at row/row 20
128 sts | at row/row 40

Knitting directions for this center-out circle, knitted flat. Pinhole CO 8 stitches (counts as Row 1), then double (inc) after each # of plain rows as follows:
Knit 3 rows.
Next row (row 5): double to 16 sts. Knit 4 rows
Next round (row 10): double to 32 sts. Knit [(previous # of knit rows X 2) + 1] rows = (4*2)+1 rows = 9 rows
Next row (row 20): double to 64 sts. Knit [(previous # of knit rows X 2) + 1] rows = (9*2)+1 rows= 19 rows
Next row (row 40): double to 128 sts. Etc.
Note: Increases can be kf&b or backwards loop increases, which will be hidden by the ridges.

To generalize for any pattern stitch:
Determine the number of slices (10 might be easiest math-wise)
Knit a swatch in the pattern stitch to get the height and width of a stitch
Calculate target stitch counts for inc rows by doubling the slice – for 10 slices: 10 sts, 20 sts, 40 sts, 80 sts, etc.
Calculate a radius for each of the doubled st counts using the stitch width from your gauge
Use row height to calculate the # of of rows that have to be worked to achieve each radius. From this you know which row to work the increase, and how many non-increase rows to work between increase rows.



In the Figure, ovals represent sts in garter stitch height/width proportions, and # of sts per slice at each increase row.