Pythagorean Triangle Hat

A Geometry-Inspired Hat, suitable for either gender.

You don't have to like math, geometry, or science to wear this hat, but if you wear it, you might end up a math whiz! The stitch pattern is made up of Pythagorean right triangles, inspired by a stitch pattern in Barbara Walker's Second Treasury, but modified to work better in hat form. The triangles are inspired by fractal patterns, in which big triangles are made up of smaller triangles, and you can imagine zooming down to smaller triangles yet. The decreases are even ever smaller triangles. Directions make a hat which fits size women's medium to size men's medium as a beanie, fitting over the tops of the ears. Size unstretched is 18 1/2 inches diameter, 7 inches deep, but stitch pattern is quite stretchy; models shown have large heads. For a youth hat, worsted weight yarn should give appropriate sizing. More sizes to come once they have been test-knit.

Materials

125 yards heavy worsted weight yarn, knitting up at gauge 18 stitches to 4 inches/20 cm, row gauge 24 stitches to 4 inches/20 cm. Hat shown was made in Sanguine Gryphon QED, colorway "Philosopher's Stone".

Circular needle in size 7 or size to achieve gauge, plus method of choice for top of hat (second circular needle, double-pointed needles, or magic loop)

Stitch marker

Directions

Body

Cast on 84 stitches, using your favorite stretchy cast-on. I recommend long-tail cast-on, or (my favorite for hats) Bavarian twisted cast-on. Join to work in the round, ensuring that stitches are not twisted, and placing stitch marker at beginning of round.

Ribbing: *K2 p2*, repeat between * * to end of round. Repeat for 7 rounds total (1 inch) or desired length.

Start pattern stitch (Chart A on last page)

Round 1: *K6, p6*, repeat to end of round

Round 2: *P1, K5, P5, K1*, repeat to end of round

Round 3: *P2, K4, P4, K2*, repeat to end of round

Round 4: *P3, K3, P3, K3*, repeat to end of round

Round 5: *P4, K2, P2, K4*, repeat to end of round

Round 6: *P5, K1, P1, K5*, repeat to end of round

Round 7: *P6, K6*, repeat to end of round

Round 8: *K6, P6*, repeat to end of round

Round 9: *K5, P1, K1, P5*, repeat to end of round

Round 10: *K4, P2, K2, P4*, repeat to end of round

Round 11: *K3, P3, K3, P3*, repeat to end of round

Round 12: *K2, P4, K4, P2*, repeat to end of round

Round 13: *K1, P5, K5, P1*, repeat to end of round

Round 14: *P6, K6*, repeat to end of round

After knitting rounds 1-14 once, repeat rounds 1-14 a second time, then knit rounds 1-7. Piece should measure approximately 5.5 inches long at this point if your row gauge is correct.

Decrease Crown (Chart B)

Round 1: *K 6, P 6*, repeat to end of round

Round 2: *SSK, K3, P1, K1, P3, P2tog*, repeat to end of round (70 stitches)

Round 3: *K3, P2, K2, P3*, repeat to end of round (70 stitches)

Round 4: *K2, P1, P2tog, SSK, K1, P2*, repeat to end of round (56 stitches). Switch when needed to add second circular needle, double pointed needles, or Magic Loop.

Round 5: *K1, P3, K3, P1*, repeat to end of round (56 stitches)

Round 6: *P2tog, P2, SSK, K2*, repeat to end of round (42 stitches)

Round 7: *K3 P3*, repeat to end of round (42 stitches)

Round 8: *K2tog, K1, P2tog, P1*, repeat to end of round (28 stitches)

Round 9: *K2tog, P2tog*, repeat to end of round (14 stitches)

Round 10: *K2tog* around (7 stitches).

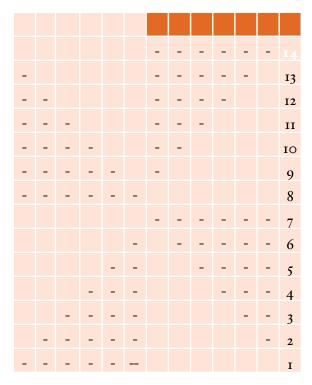Break yarn to about a six inch (15 cm) length. Thread through remaining 7 stitches twice around (this fills any gap nicely) and weave in ends. If you weave in ends tidily, hat is essentially reversible.

Wash and block. I like to block my hats over a balloon blown up to approximate size (about two inches smaller than head size), but flat or on a wig form also works.

Charts follow on last page.

Chart A

1	2	3	4	5	6	7	8	9	10	11	12	Row
						▧	▧	▧	▧	▧	▧	(orange)
						-	-	-	-	-	-	14
-						-	-	-	-	-		13
-	-					-	-	-	-			12
-	-	-				-	-	-				11
-	-	-	-			-	-					10
-	-	-	-	-		-						9
-	-	-	-	-	-							8
						-	-	-	-	-	-	7
				-			-	-	-	-	-	6
			-	-				-	-	-	-	5
		-	-	-					-	-	-	4
	-	-	-	-						-	-	3
-	-	-	-	-							-	2
-	-	-	-	-	-							1

Chart B

1	2	3	4	5	6	7	8	9	10	11	12	Row
▧	▧	▧	▧	▧	▧	▧	▧	▧	/		▧	10
▧	=	▧	▧	▧	▧	▧	▧	▧	/	▧	▧	9
▧	-	=	▧	▧	▧	▧	▧	▧	/		▧	8
▧	-	-	-	▧	▧	▧	▧				▧	7
▧			\	▧	▧	▧	▧	-	-	=	▧	6
▧	-				▧	▧	-	-	-		▧	5
▧	-	-		\	▧	▧	=	-			▧	4
▧	-	-	-			-	-				▧	3
▧	=	-	-	-		-				\	▧	2
-	-	-	-	-	-							1

Key:

blank: knit

\- : purl

/ : knit 2 together

\ : slip, slip, knit

= : purl 2 together

Shaded square: no stitch

   (stitches decreased away)