180° Rotational Symmetry

The three images at right exhibit 180° rotational symmetry. The image is the same if you turn it upside down, see E6.4.1.

These three examples all have ***n*** = 6 with toggle mirror turned on, but the images vary by the number of jumps in the jump set and by ***r***.

The top image has 3 jumps in the jump set: (6,6,J(1,3,5)).

The middle image has 4 jumps in the jump set: (6,14,J(1,2,4,5)).

The bottom image has 5 jumps in the jump set: (6,10,J(1,2,3,4,5)).

To create your own image, follow these ***n***, Jump set and ***r*** rules.

n*.** The ***n-gon must be even.

Jump Set. The number of jumps in the jump set, ***k***, can either be even or odd. If ***k*** is even, each first half jump is matched with a second half jump with no middle jump. If ***k*** is odd, then there is a single non-matched middle jump separating the halves of the jump set. Both have the same rule about first and second half of jumps in the set.

First/Second Half. Jumps prior to the middle jump can be any value but jumps past the middle are mirrored reflections of the initial jump. For example, J_1 and $J_k = n\text{-}J_1$ and J_2 and $J_{k\text{-}1} = n\text{-}J_2$, and so on.

If ***k*** is odd, the middle jump must equal ***n***/2, like the 3 in top and bottom images to the right. This creates the partial diameter lines from 1-4 at top and 0-3 at bottom.

r*.** Twice the reduction factor must be a multiple of ***k.

Another example. The bottom left (26,15,J(5,11,3,23,15,21)) 30-line image follows these rules. It is worthwhile to follow the first jump set worth of lines in this instance. The endpoints are on the following vertex radius vertices: 5, 16, 19, 16, 5, 0. These four vertex radii (0, 5, 16, and 19) are used in each of the 5 sets (30 = 5·6); the only difference is that each subsequent set is ***k***/***r*** = 2/5 in on the vertex radius according to the radius reduction rule. Consider the sharp points on the vertical diameter created by J_6 and J_1. They are separated from each other by 2/5 of a radius along the line from 0 to 13.