## Pencil and Ruler Exercise: Varying J (polygonal vertex jumps)

for fixed $\boldsymbol{n}$ (vertices in polygon), $\boldsymbol{S}$ (subdivisions between vertices) and $\boldsymbol{P}$ (subdivisions between points)
FACT: All four subdivision dot-plots have the same number of $\boldsymbol{n}, \boldsymbol{n}=$ $\qquad$ , and the same number for $\boldsymbol{S}, \boldsymbol{S}=$ $\qquad$ .
Drawing Instructions: Start at the top of each circle and draw each image from point to point with pencil and ruler assuming two subdivisions between points, $\boldsymbol{P}=\mathbf{2}$.

$\boldsymbol{J}$ is 1 larger than the lower left $\boldsymbol{J}$. Therefore, this $\boldsymbol{J}=$ $\qquad$
Briefly explain how the two lower images differ from one another. $\qquad$
Does this help you see why you only need to think about jumps where $\boldsymbol{J}<\boldsymbol{n} / \mathbf{2}$ if all you care about is finding distinct images? The only difference in this instance is the way that the image appears to be created in moving around the vertex frame. One version appears to be drawn in a clockwise fashion the other appears to be drawn counterclockwise.

