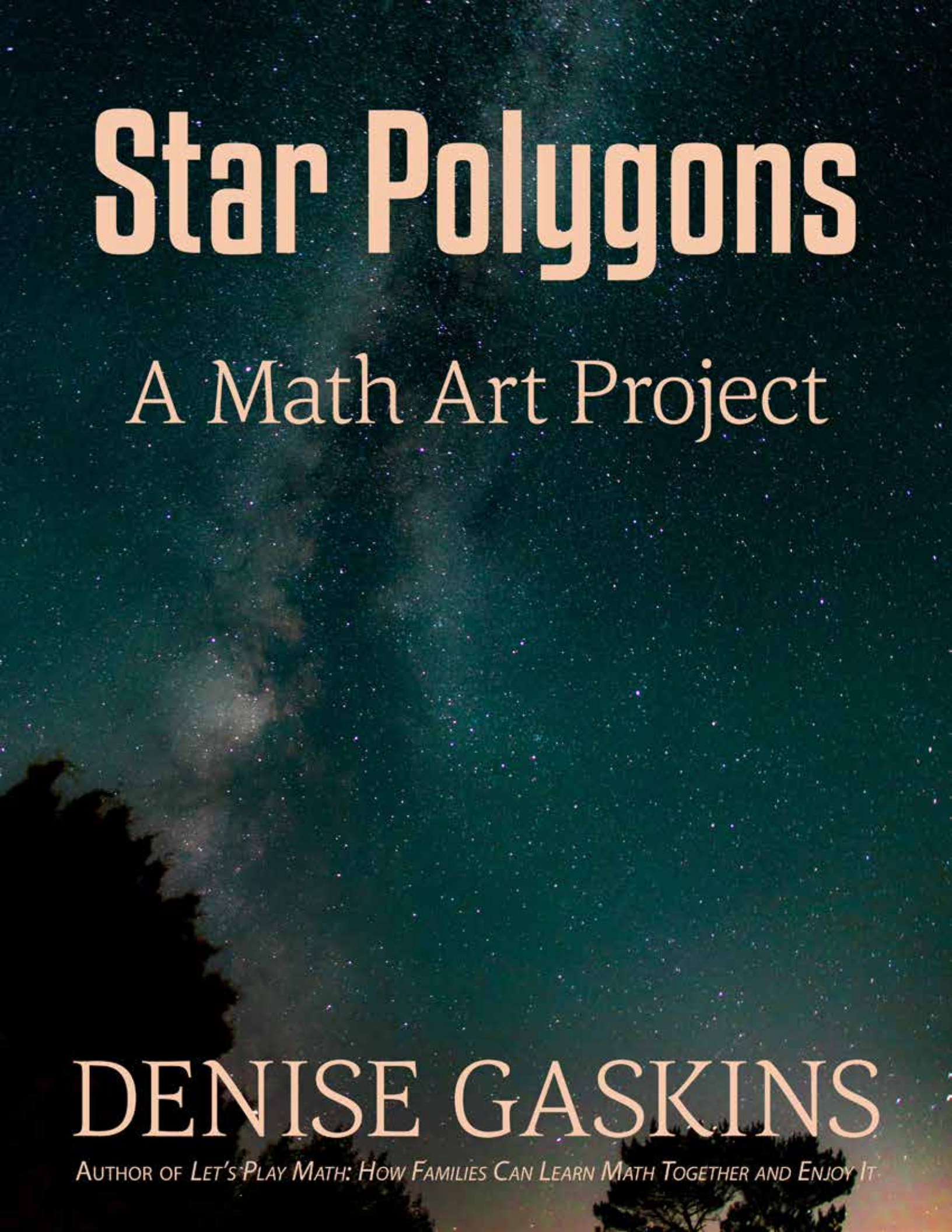

Star Polygons

A Math Art Project

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Contents

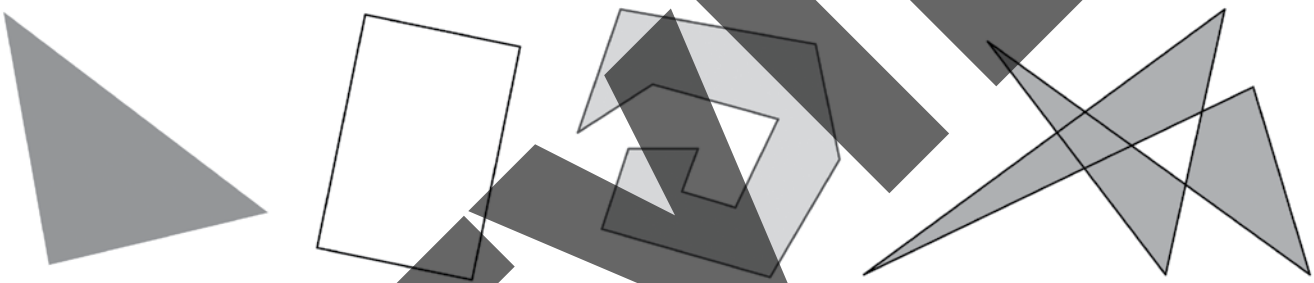
What Is a Star Polygon?

An Introduction for Parents and Teachers

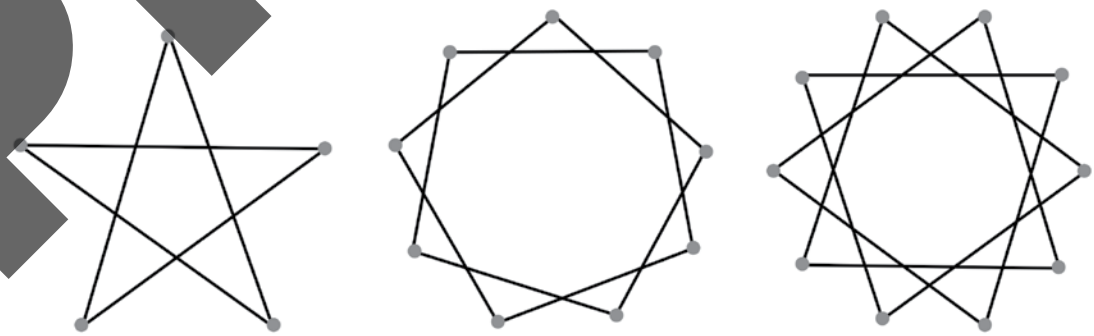
Math and art combine beautifully to stimulate children's thinking about geometry. In this project, students will create a variety of star polygons and related figures to explore symmetry, angles, and number relationships.

Your children are probably used to thinking about convex polygons like triangles and squares. In a *convex* polygon, none of the corners "bump in." The official mathematical definition for a convex shape is that you can connect any two points with a line segment that stays entirely within the shape. Using that definition, can you prove that two of the figures below are *not* convex?

Students may also have worked with *concave* polygons, which have a "bumped-in"

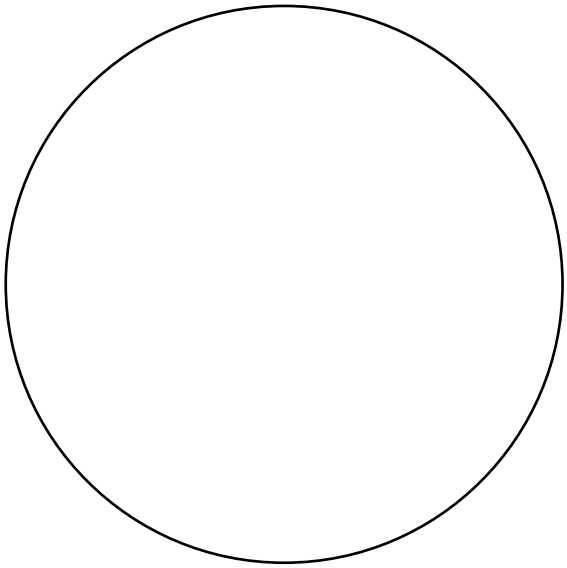


Polygons are flat, *closed* (connected all the way around) shapes with all straight sides.



Star polygon edges cross without forming an intersection, as if they existed on different layers. The *vertices* (points of the star) are the only places where the line segments meet each other.

1 *If your children haven't played with concave shapes, you might enjoy Christopher Danielson's ideas in this article: middleweb.com/33478/how-i-learned-to-love-middle-school-geometry.*



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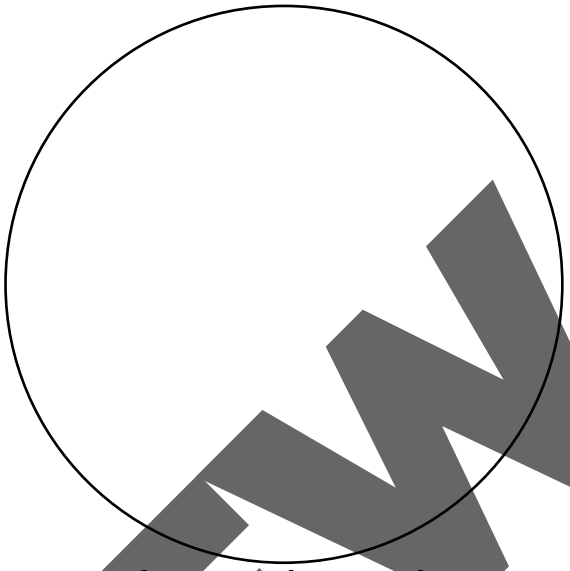

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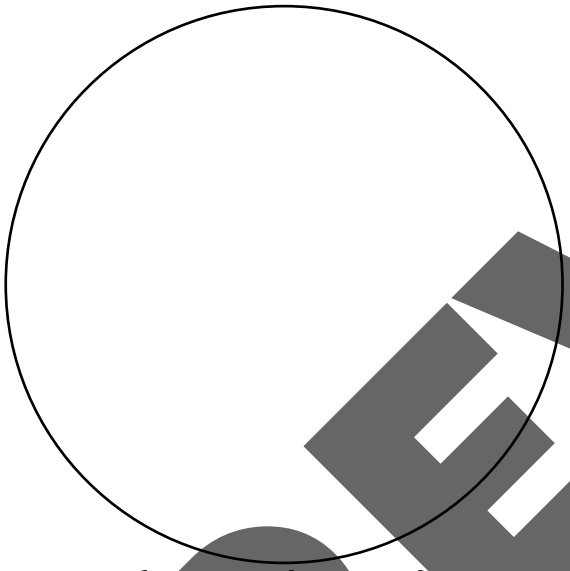

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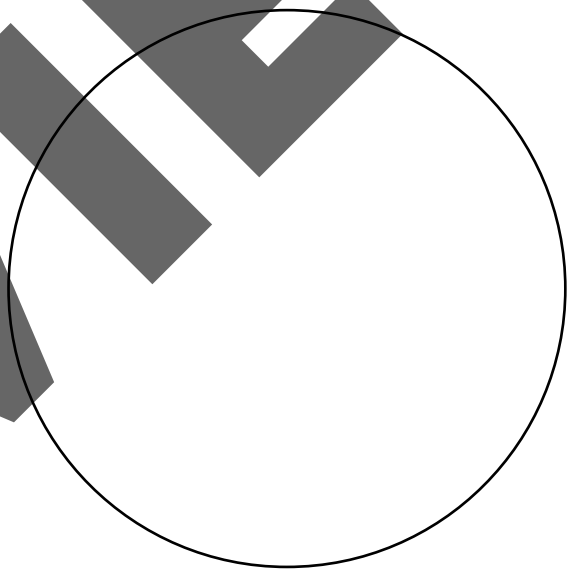

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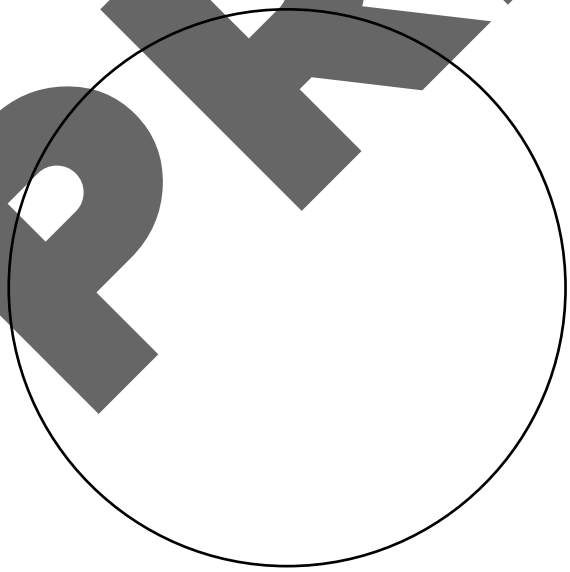

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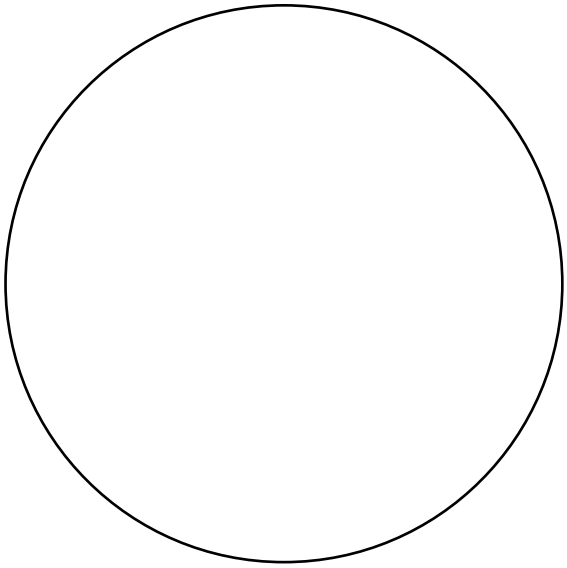

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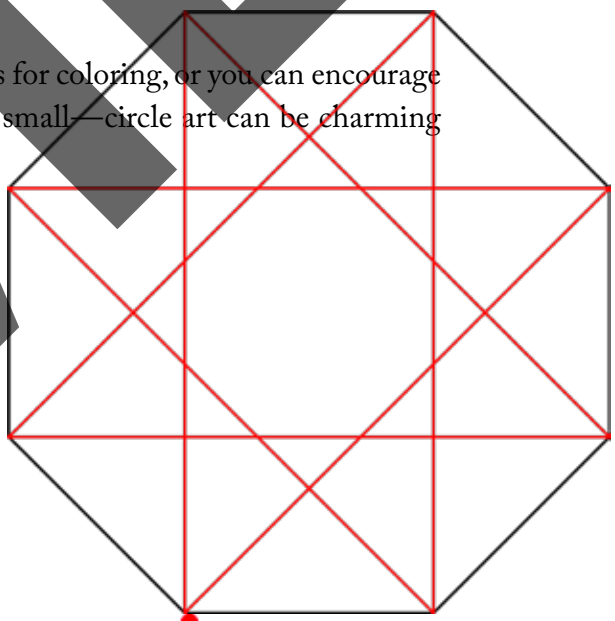
Create Math Art

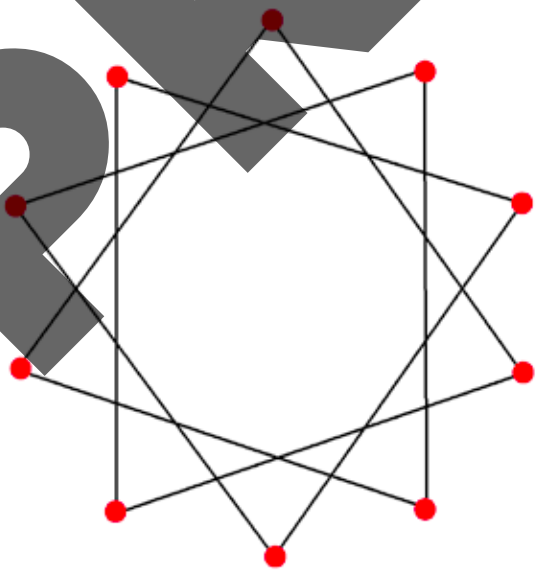
Ask your students to choose a favorite star polygon and turn it into mathematical art.

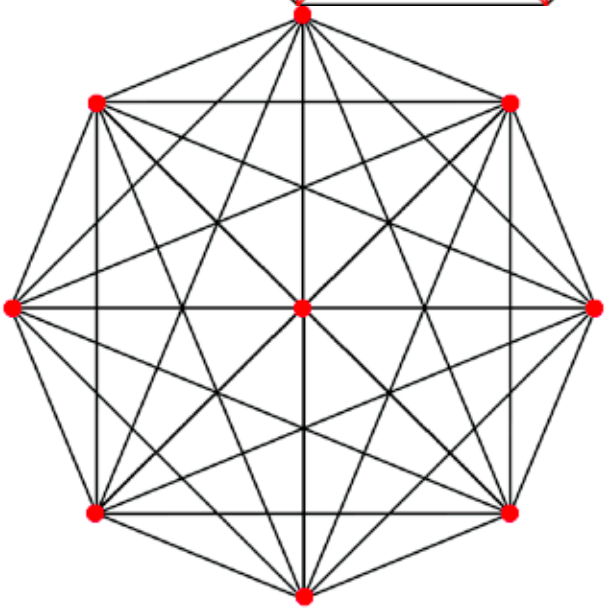
For instance, they might…

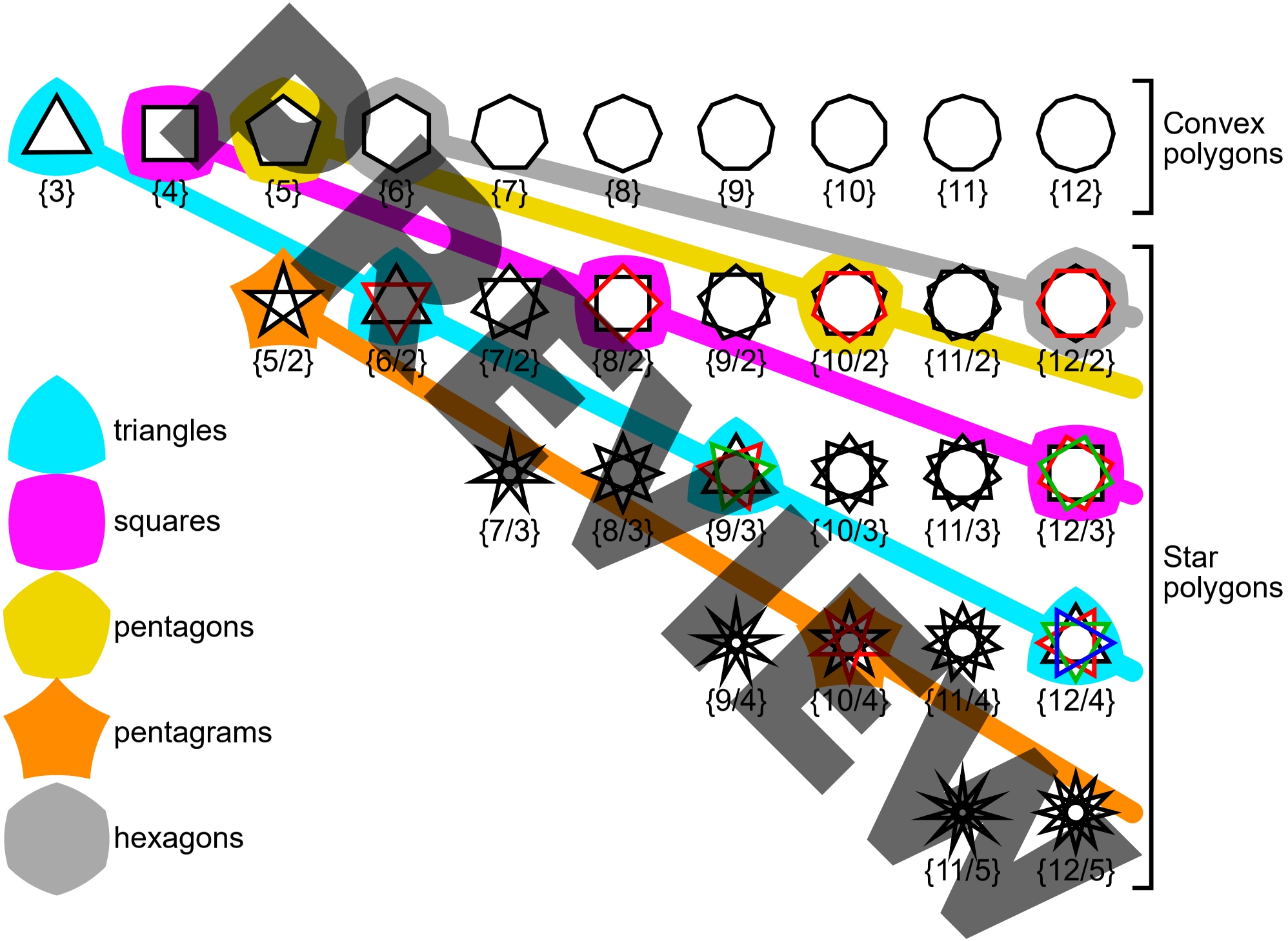
- ★ Draw the polygon on a big circle, and color it. Cut it out to mount on a contrasting background.
- ★ Doodle a pattern in each section of the star. Add bits of accent color and balancing areas of dark shading to create a pleasing design.
- ★ Draw the star with white crayon, oil pastel, or masking fluid. Paint with watercolor.
- ★ Use colored string or embroidery floss to stitch a star pattern on canvas or card stock.

I've included a large circle worksheet to draw stars for coloring, or you can encourage children to work even larger on art paper. Or work small—circle art can be charming on handmade greeting cards.





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Convex polygons
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Star polygons
triangles
squares
pentagons
pentagrams
hexagons