What's Regular About Tessellations?

NAME_____

Use regular polygons to explore regular and semi-regular tessellations. Begin your exploration by reviewing interior angle measures of regular polygons.

1. Complete the table below. Look for relationships between the number of angles and the sum of the interior angle measures for any polygon.

Number of Angles	Name of Polygon	Sum of Interior Angle Measures	Measure of Each Interior Angle
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

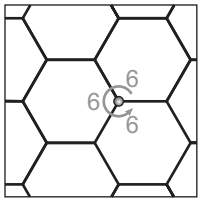
Next, explore using the Tessellation Creator. Experiment with the tool by dragging shapes onto the virtual plane, changing colors, zooming, translating, rotating, copying, and deleting shapes.

2. Which regular polygons will tessellate on their own without any spaces or overlaps?

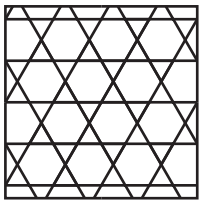
3. Are there any mathematical reasons why these are the only shapes that will tessellate? (**Hint:** How many degrees are there in a circle?)

4. Is it possible to tile the plane using only regular octagons? Why or why not?

In the previous questions you explored regular tessellations. A regular tessellation is a design covering the plane made using 1 type of regular polygons. A semi-regular tessellation is made using 2 or more types of regular polygons. With both regular and semi-regular tessellations, the arrangement of polygons around every vertex point must be identical. This arrangement identifies the tessellation. For example, a regular tessellation made of hexagons would have a vertex configuration of {6, 6, 6} because three hexagons surround any random vertex.



5. Use the Tessellation Creator to find at least 2 semi-regular tessellations. Sketch them in the table below. Classify each tessellation by listing the clockwise or counterclockwise configuration of polygons surrounding each vertex. An example has been provided for you.

SKETCH OF SEMI-REGULAR TESSELLATION	VERTEX CONFIGURATION	INTERIOR ANGLE MEASURES AND SUM
	{3, 6, 3, 6}	60° +120° +60° +120° = 360°

6. Define each of the following terms in your own words.

a) regular polygon

b) regular tessellation

c) semi-regular tessellation

d) vertex configuration

7. Jack claims he constructed a semi-regular tessellation with vertex configuration {3, 4, 6}.

a) What do the numbers 3, 4, and 6 refer to?

b) Explain why a semi-regular tessellation with a vertex configuration of {3, 4, 6} would not work.

c) How could Jack revise his vertex configuration so that it would correctly represent a semi-regular tessellation?