

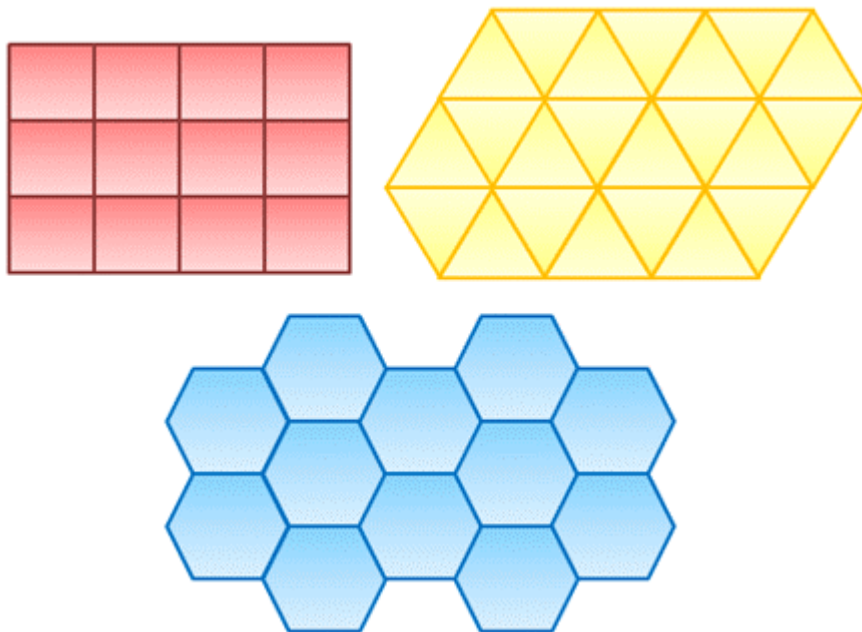
Regular Tilings of the Plane

Definition: A **Regular Polygon** is a polygon that has all sides equal and all interior angles equal. A regular polygon is convex - all the vertices point outward.

Definition: A **Regular Tiling of the Plane** is an arrangement of regular polygons fitting together to cover the plane without leaving any gaps or overlapping.

There are only three regular tilings of the plane with their vertices meeting as follows:

1. Six equilateral triangles.
2. Four squares.
3. Three regular hexagons.



So, why are there only three?

Looking at the points where the vertices meet you will notice that the angles have to add up to exactly 360 degrees. For the three regular tilings shown above that works out to:

1. Six equilateral triangles. $6 \times 60 = 360$
2. Four squares. $4 \times 90 = 360$
3. Three regular hexagons. $3 \times 120 = 360$

The pentagon (5 sides) has interior angles of 108 degrees, and 108 doesn't divide evenly into 360.

Polygons with more sides than a hexagon have interior angles larger than those of a hexagon, so the sum of the angles would be greater than 360 degrees. That wouldn't work. They would have to overlap.

So, that's a simple introduction to regular tilings. Are there other kinds? Of course! We'll look at some of those in future articles.