

Tessellations

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“A **tessellation** is the tiling of a plane using one or more geometric shapes, called tiles, with no overlaps and no gaps”.

A tessellation is **regular** if it satisfies the following conditions.

1. The tessellation must tile a floor (that goes on forever) with no overlapping or gaps.
2. The tiles must be regular polygons - and all the same.
3. Each vertex must look the same.

Problem 1

1. Draw a regular tessellation of triangles.
2. Draw a regular tessellation of squares.
3. Can you draw a regular tessellation of pentagons?
4. How about hexagons?

Problem 2

Show that there are no other regular tessellations except triangles, squares, and hexagons.

A tessellation is **semi-regular** if it is made of two or more regular polygons such that the pattern at each vertex is the same.

Problem 3

Draw a semi-regular tessellation made of triangles and hexagons.

Problem 4

1. Draw a semi-regular tessellation made of triangles and squares.
2. Find all different semi-regular tessellations made of triangles and squares.

Problem 5

1. Draw a semi-regular tessellation made of a triangle, square, and hexagon.
2. Draw a semi-regular tessellation made of triangles and hexagons.
3. Find all different semi-regular tessellations that contain hexagons.

Problem 6

Find a semi-regular tessellation made of squares and octagons.

Problem 7

Find a semi-regular tessellation made of triangles and dodecagons (regular polygon of 12 sides).

Problem 8

Prove that there are no other semi-regular tessellations different from the ones you have found in Problem 3-7.

Problem 9

Following the following procedure to make your own tessellation.

1. Draw a square of 1 inch.
2. Write **NW** in the northwest corner, **SW** in the southwest corner, **NE** in the northeast corner, and **SE** in the southeast corner.
3. Draw a random line on the paper left-to-right.
4. Draw a second random line on the paper top-to-bottom.
5. Cut out your shapes on the lines you drew.
6. Put the pieces together so corners are in the middle and they spell “SE-SW-NW-NE”.
7. Tape the pieces together.
8. Trace you figure with a pencil on a piece of white paper.
9. Extend your figure parallellly on the white paper.
10. Color your figure.