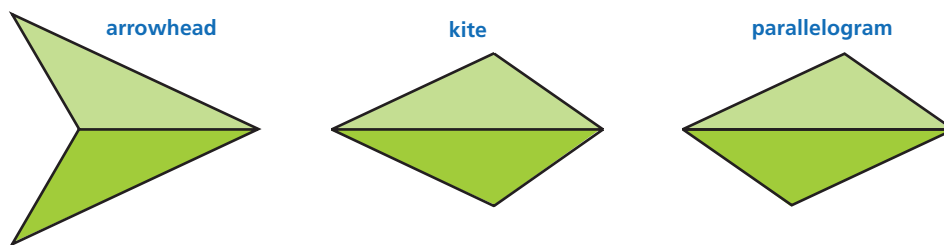
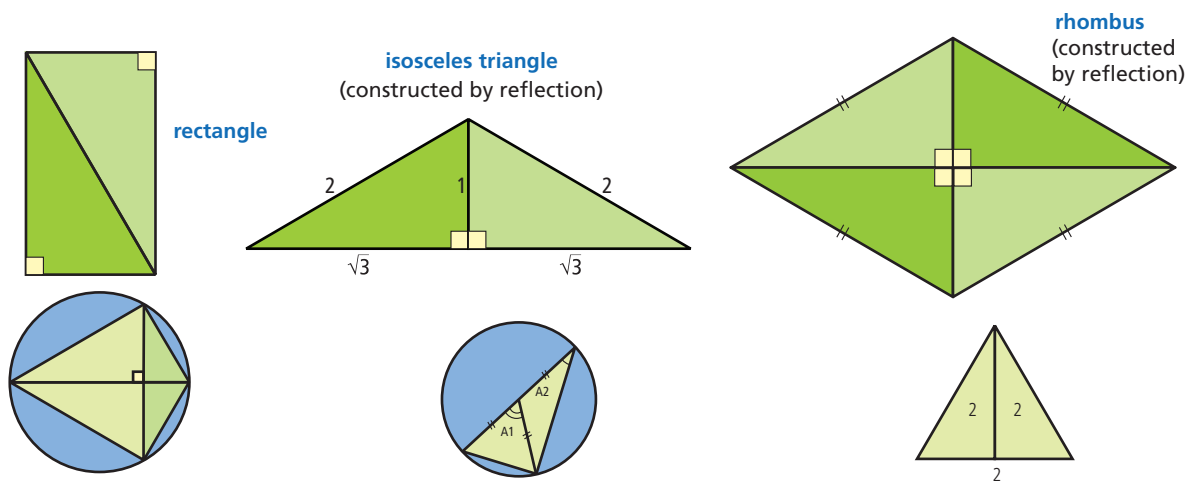


Using triangles to make other shapes

The scalene triangle (shape 38) can be used to make these shapes.



The right-angle triangle (shape 36) can be used to make these shapes.



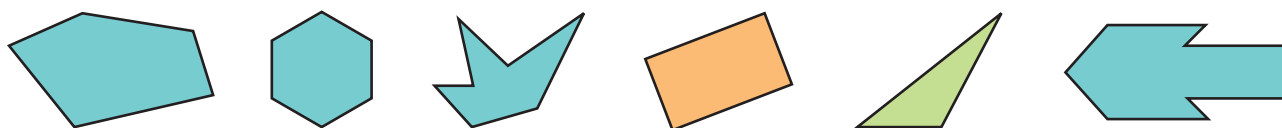
Using right-angled triangles, a cyclic kite can be formed.

The angle at the centre of a circle is double the angle at the circumference. The midpoint of the hypotenuse of a right-angled triangle is equidistant from the three vertices.

By reflection, an equilateral triangle can be formed.

Polygons

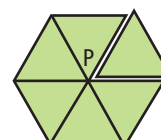
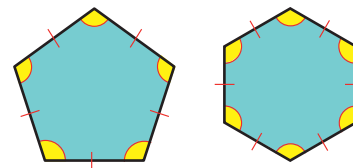
A polygon is a closed 2 dimensional figure with three or more straight sides. These are all polygons:



Common polygons have names which reflect the number of sides, such as **tri**angle, **quad**rilateral and **pen**tagon. They are described as **regular** if all their sides are equal in length, and all their interior angles are equal. The more sides a polygon has, the closer it appears to be a circle.

There are 13 different polygons on Mathomat. Of these, six are regular: equilateral triangle, square, pentagon, hexagon, octagon and dodecagon.

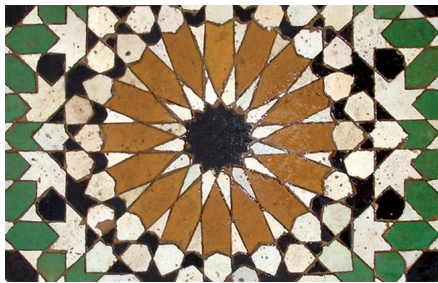
The area of a polygon is the polygonal region. If you think about filling a space around a point, which regions will fit perfectly without gaps or overlapping? As discovered in Get Tessellating, three regular polygons will do this: the equilateral triangle, the square and the hexagon.



Tessellating shapes

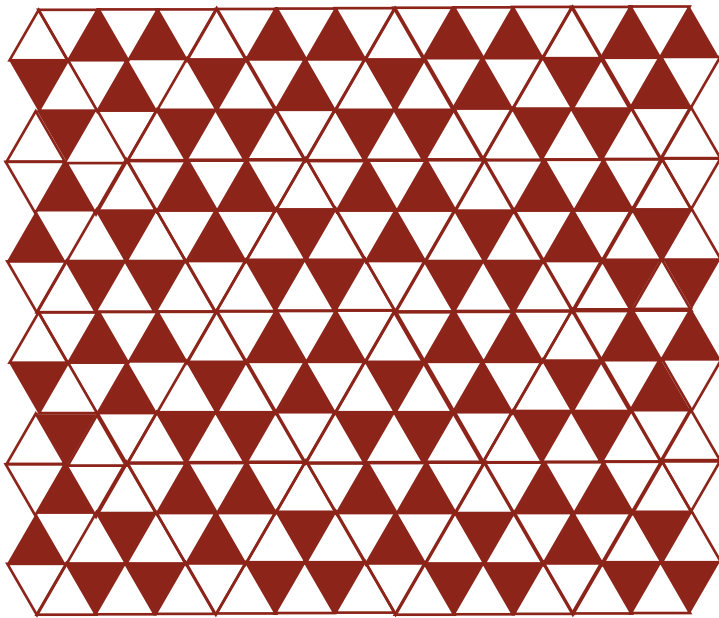
A tessellation is a tiling pattern that covers a plane without leaving any gaps.

There are wonderful examples especially in Islamic architecture. Mathomat offers a wealth of possibilities to create such patterns.



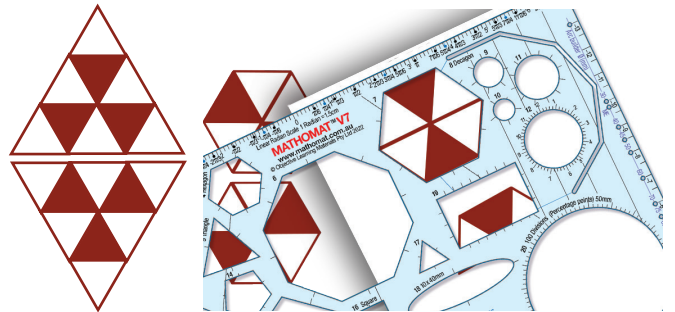
Part of a floor design (left) and (above) tessellations decorate the walls of the Royal Palace in Fez, Morocco.

This pattern which uses equilateral triangles was used on the floor of a Roman house in the first century AD.



You can hold Mathomat over this pattern to find the following repeats:

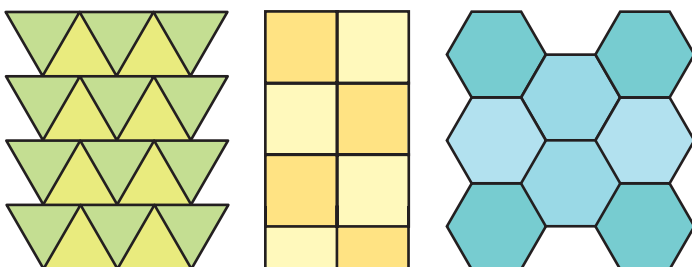
- A trapezium (shape 31) with 2 light and one dark tile
- A hexagon (shape 7) with 4 light and 2 dark tiles.
- You can also visualise a parallelogram in the pattern with 12 light and 6 dark tiles and an equilateral triangle with 6 light and 6 dark triangles.



Tessellations with regular and irregular polygonal regions

Polygonal regions can be rotated, translated or reflected to fill a plane without any spaces. The regions may be regular or irregular.

regular tessellations



irregular tessellations

