Discussion of a worksheet

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Problems 1 and 2

We ask students to draw tessellations. They need to learn to create enough of the tiling to show what the actual pattern is. We reccommend at least 12 tiles (3 x 4) to establish a nice pattern).

The tessellations of the parallellograms use a homework assignment which asks the students to show that parallellograms side by side form a tessellation of a "strip" (area between two parallel lines). Stacking these strips shows heuristically that any parallelogram will tessellate the plane. And the same is of course true for squares and rectangles.

Problem 3

If we rotate a triangle 180 degrees about the midpoint of one of its sides the preimage and the image will combine into a new shape. It can be shown that this is a parallellogram. Looking at these three types of triangles shows that we can actually get parallelograms, rectangles or squares.

Problem 4

Here we put everything together to show that any triangle can tessellate the plane. And we even have an algorithm for doing so.

Note

Showing all quadrilaterals tessellate is much harder. There is an exploration that uses GSP to give an experimental demonstration of the fact.

Problems 5, 6 and 7

We may or may not have seen regular polygons at this point. If we haven't a very short introduction will get everyone going. We just introduce the fact here that there are exactly 3 regular tessellations. Another explorations outlines a proof as to why this is the case. The discussion of the regular pentagon shows that an angle argument suffices to show that it can not tessellate the plane. The non-regular pentagon shows that the result we have is a very specific statement. I mention this again later.

Problems 8 and 9

This is a short introduction to semi-regular tessellations. We don't have a lot of in-class work for this topic, but there are some homework problems that relate to it.