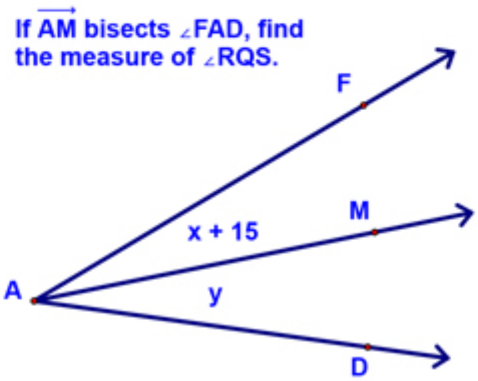
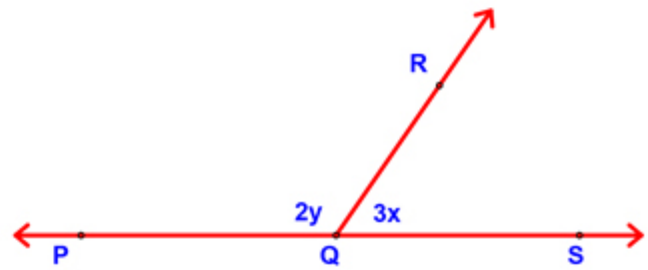
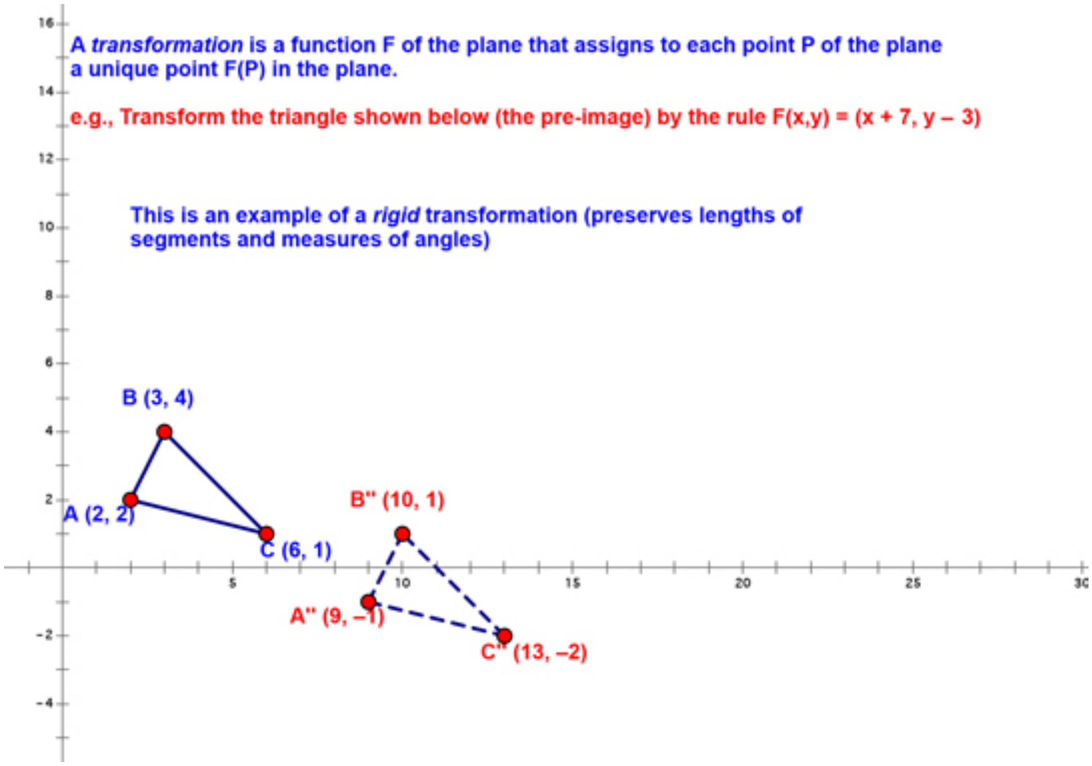
Transformations & Symmetry - Lesson 1-6

Today, have a lot of notes! Here's a warmup to start:

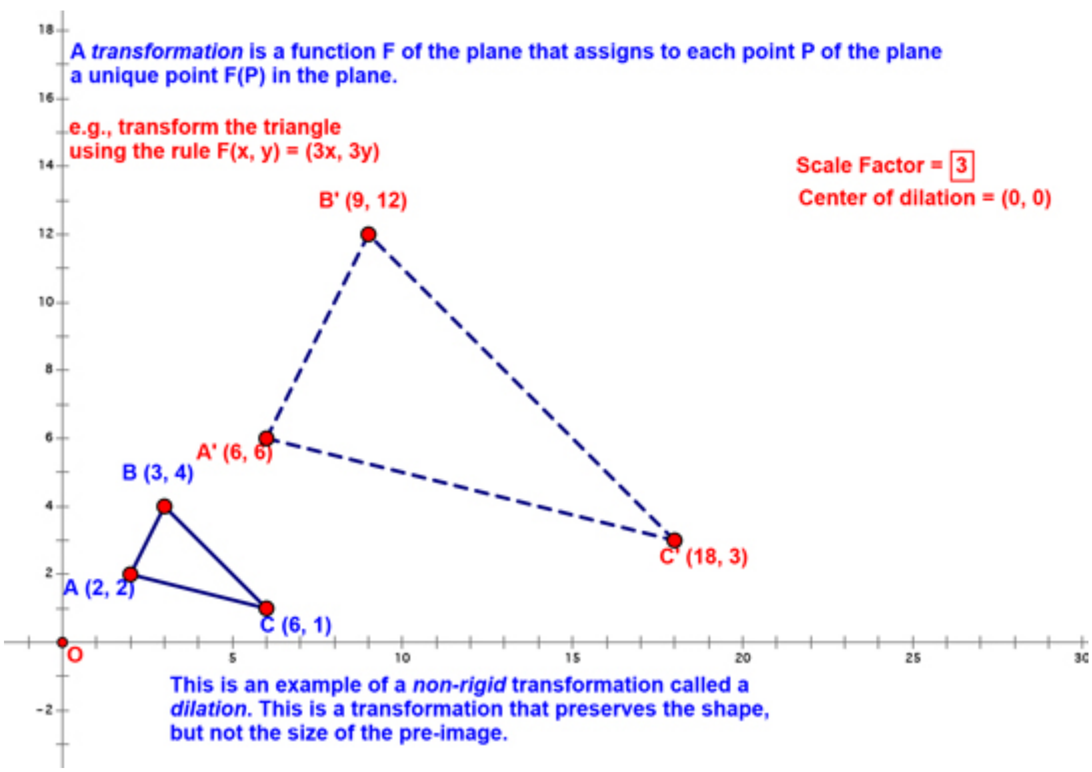




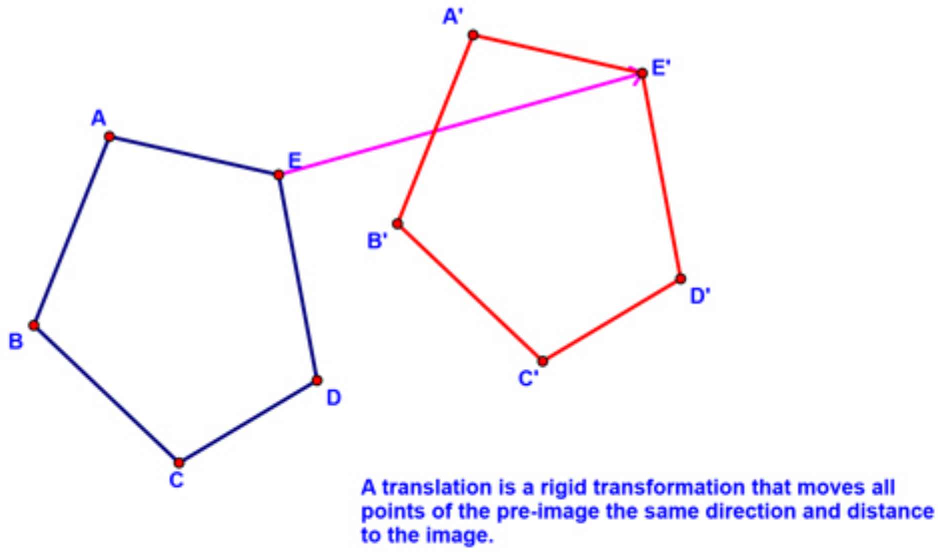
Let's start the lesson by defining a *rigid transformation* and showing an example:



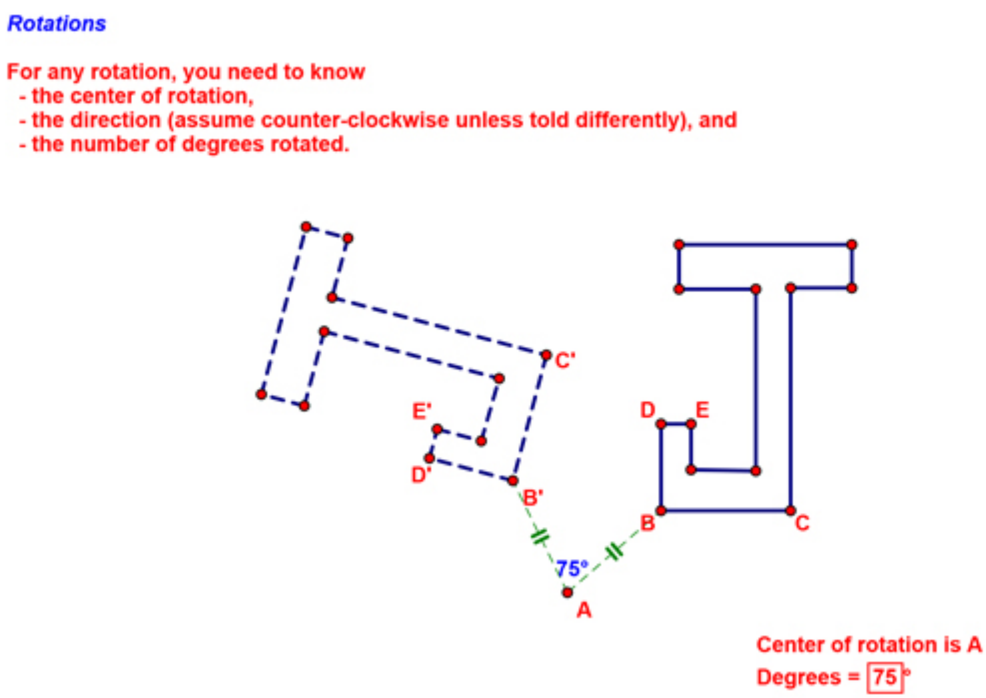
Next, let's learn about a non-rigid transformation and showed an example...something called a *dilation*.



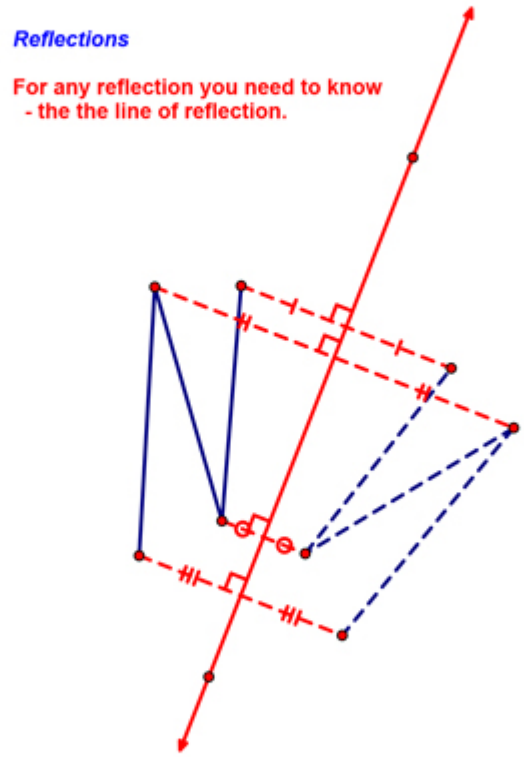
This year, we'll only be studying rigid transformations! Of these, there are three types you'll need to know: *translations, rotations, and reflections*. Here's the definition of a translation:



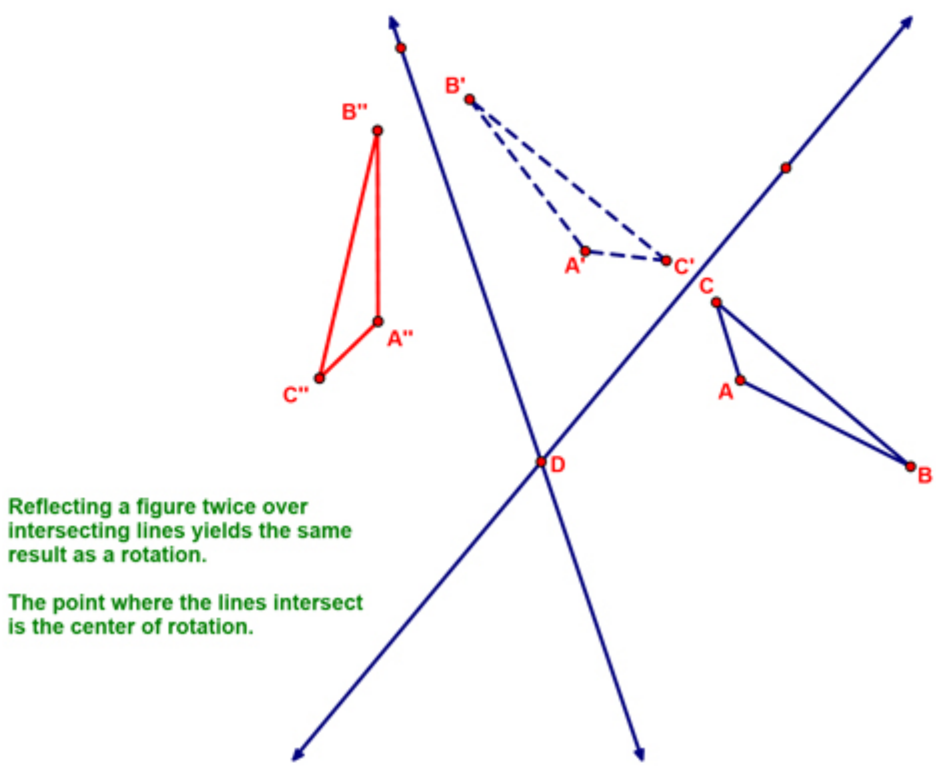
Now, we'll define rotations. For these, we noted a few things we need to know:



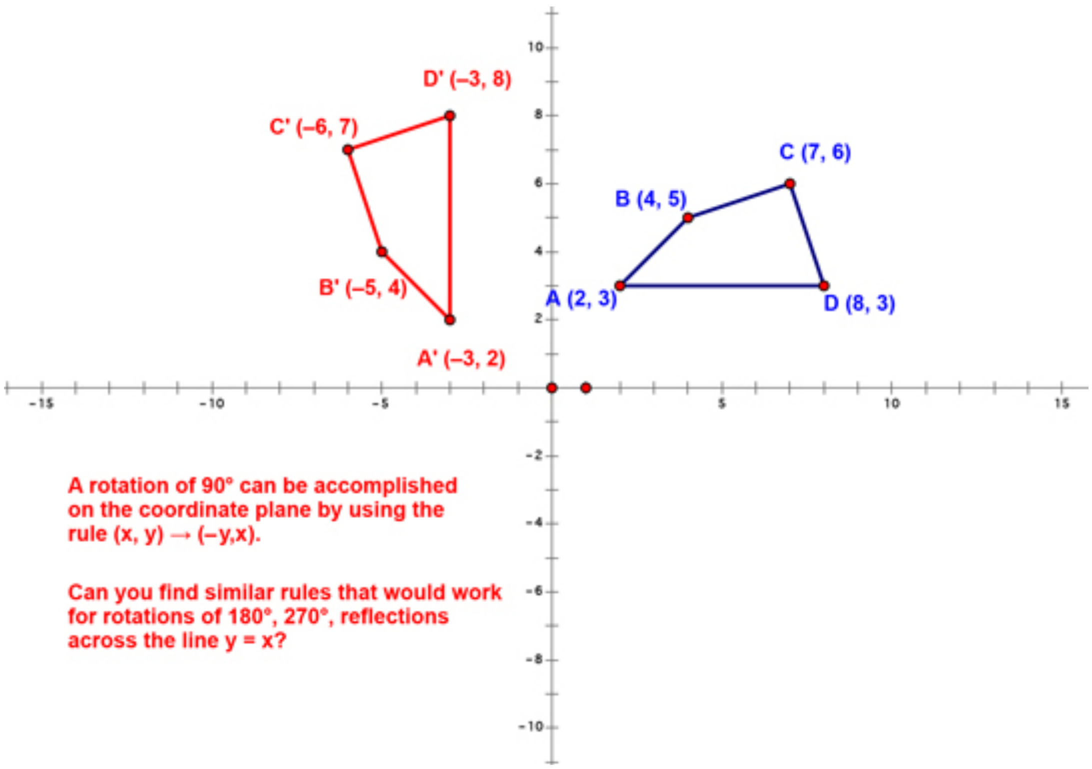
And now, reflections. For these, we need a pre-image and a line over which we can reflect!



Next, I show you how two reflections, over intersecting lines, give the same result as a rotation! Can you determine the degree the pre-image was rotated to form the image here? (It's 117°)

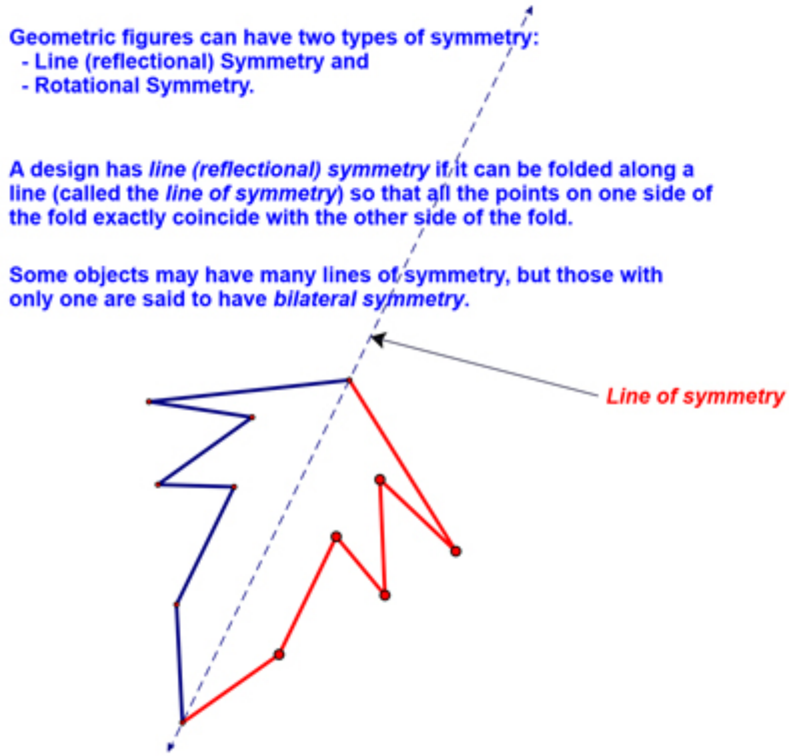


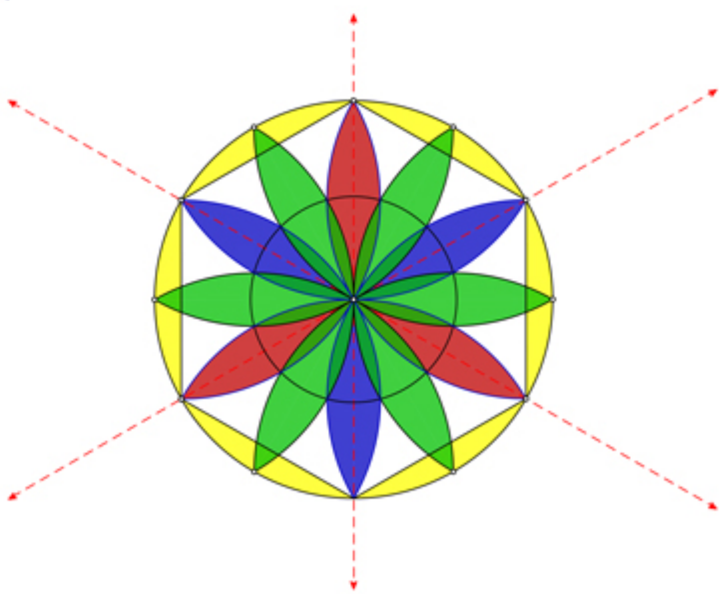
There are some special rules that you can use when performing specific transformations on the coordinate plane:



The other rules, in case you were wondering, are (x, y)-->(-x, -y) for 180° rotation, (x, y)-->(y, -x) for 270° rotation and (x, y)-->(y, x) for a reflection across the line y=x.

Now let's talk about different types of symmetry...starting with *line symmetry:*



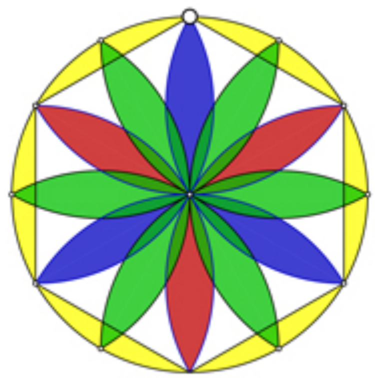


And FINALLY we'll wrap up by discussing rotational symmetry:

Geometric figures can have two types of symmetry:
- **Line (reflectional) Symmetry and**
- **Rotational Symmetry.**

An object has *rotational symmetry* if it can be traced and rotated less than a complete cycle about a point so that the tracing can be made to fit exactly onto the original. The number of times the tracing matches the original design in a complete cycle determines what degree of rotational symmetry the design has.

A design has *point symmetry* if it can be made to coincide with itself after a half turn (180° rotational symmetry).



What degree rotational symmetry does the first diagram have? The second?

Whew! That is a lot for one day!