Lesson 7-5R / 7.6L: Sequence of Transformations

Agenda

- Check & Review HW 7.5
- Turn in CR#6
- 7-5 Exploration and Guided Notes
- Quiz

Homework:

- Problem Set 7.5

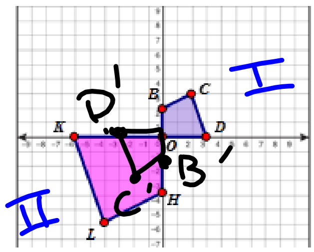
SEQUENCE OF TRANSFORMATIONS

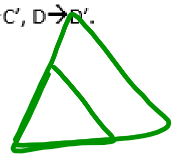
Two polygons can be proven similar if a sequence of transformations can map one onto the other. There are three approaches:

- Try to translate, rotate, and reflect to get the corresponding pre-image and image vertices to be collinear for two sides (making coincident sides) and then dilate to make the polygons the same size.
- Dilate to make the triangles congruent and then follow the translate-rotate-reflect plan.
- Perform all transformations as constructions – applicable for dilations and reflections.

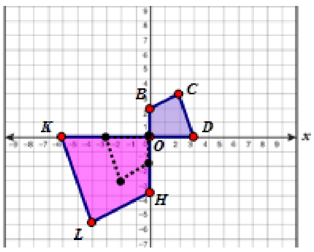
Example 1: Given OBCD ~ OHLK, identify a precise sequence of transformations to map OBCD onto OHLK.

Step 1: Since the quadrilaterals share vertex O, first try to line up $\overline{OD'}$ with $\overline{OK}$ and $\overline{OB'}$ with $\overline{OH}$. Details: Reflect OBCD into the origin or rotate OBCD around the origin by 180° to map O to itself, B→B', C→C', D→D'.





Step 2: Since D' is now collinear with K and B' is collinear with H, you can easily determine the scale factor and dilate it. Details: Dilate OB'C'D' centered at the origin by the scale factor of 2 $\left(\frac{OK}{OB'} = \frac{6}{3} = 2\right)$.

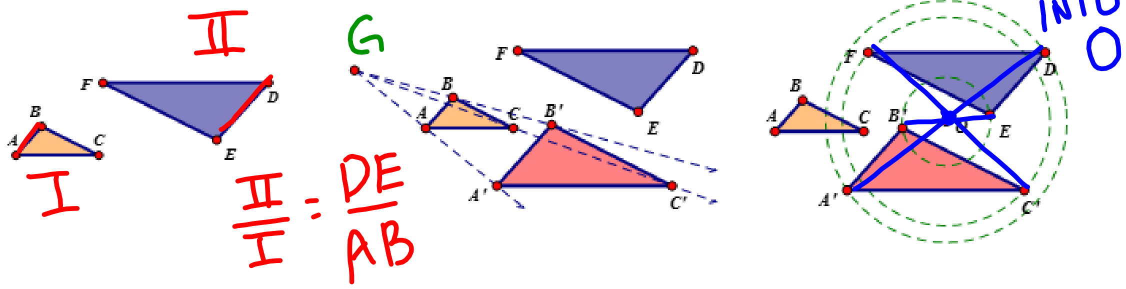


Example 2: Identify a precise sequence of transformations to map triangle ABC onto DEF.

Given that $\Delta ABC \sim \Delta DEF$, we know that a single or sequence of similarity transformations map ΔABC onto ΔDEF.

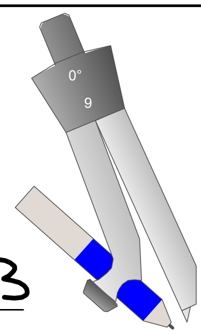
First we dilated ΔABC CENTERED @ G by the scale factor, $\frac{DE}{AB}$ so that the two triangles are the same size. This makes the two triangles congruent; they are the same size and the same shape.

Finally there exists a sequence of isometric transformations that map $\Delta A'B'C'$ onto ΔDEF. In this case a rotation of 180° maps $\Delta A'B'C'$ onto ΔDEF. OR POINT REFL INTO O

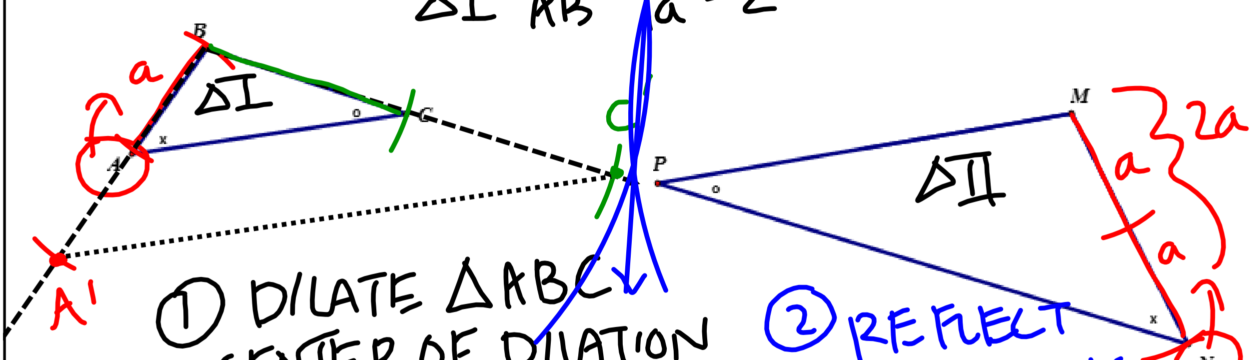


$\frac{II}{I} = \frac{DE}{AB}$

Example 3: Identify a precise sequence of transformations using constructions to map ΔABC onto ΔNMP.



- Be sure that you know the triangles are similar first. Do they satisfy a criteria? AA~
- Do you know a scale factor? $\frac{\Delta II}{\Delta I} = \frac{NM}{AB} = \frac{2a}{a} = 2$ Who will be the center of dilation? B

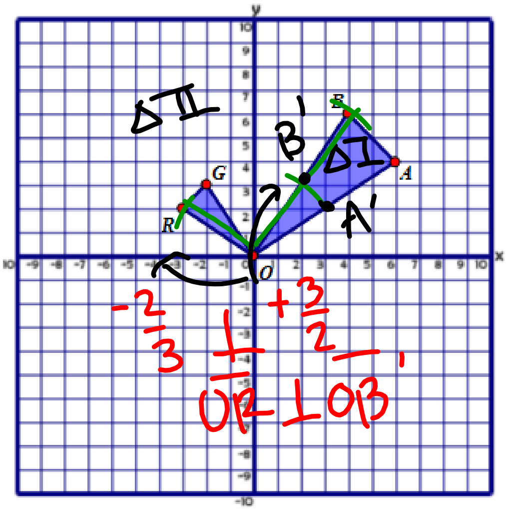


① DILATE ΔABC
CENTER OF DILATION
@B WITH SCALE
FACTOR = 2
B → B, A → A', C → C'

② REFLECT
INTO ⊥ BIS
LINE OF BM
(OR C'P, A'N)

PRACTICE:

A) Given ΔOBA~ΔORG, identify a sequence of transformations that maps ΔOBA onto ΔORG.



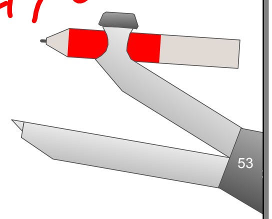
① DILATE ΔOBA CENTERED @ O BY SCALE FACTOR OF $\frac{1}{2}$

$\frac{\Delta II}{\Delta I} = \frac{OR}{OB} = \frac{1}{2}$

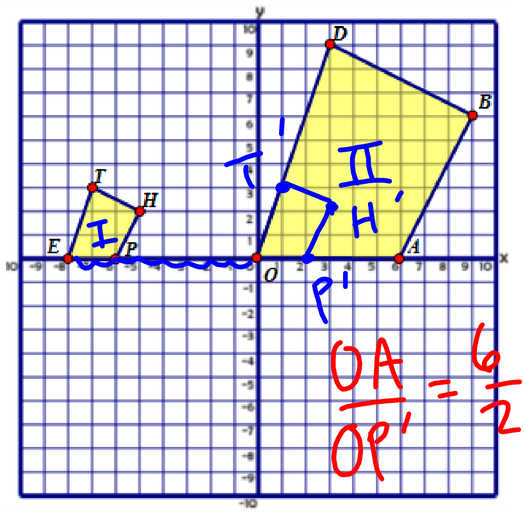
O→O, B→B', A→A'

② ROTATE CENTERED @ O BY 90°

B'→R, A'→G, O→O



B) Given ETHP~ODBA, identify a sequence of transformations that maps ETHP onto ODBA.



$\frac{OA}{OP'} = \frac{6}{2} = 3$

① TRANSLATE ETHP BY VECTOR <8, 0> 8 UNITS TO THE RIGHT

E→O, P→P', T→T', H→H'

② DILATE CENTERED AT O BY SCALE FACTOR OF 3.