

KEY CONCEPT OVERVIEW

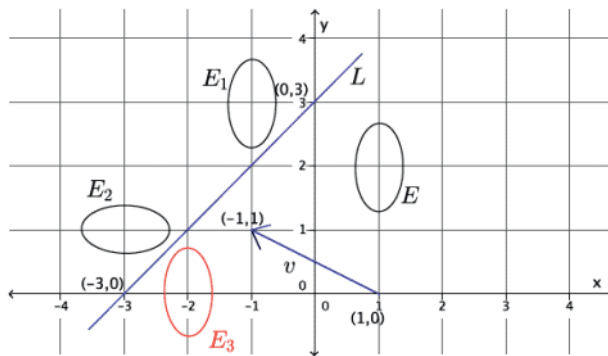
Now that students have learned to perform single transformations, they will begin sequencing transformations, or performing more than one type of transformation on the same shape. Students will investigate to determine whether performing multiple transformations changes the properties—measurements, for instance—of a shape that stayed the same during a single transformation. Precise language is essential in Topic B because students must accurately explain which object is being transformed and what each transformation requires.

You can expect to see homework that asks your child to do the following:

- Using given criteria, perform the appropriate sequence of rigid motions (translate, rotate, and reflect) on objects.
- Use accurate labeling and precise language when performing a **sequence of transformations**.
- Determine lengths of segments and measures of angles after a sequence of transformations has been performed.
- Determine whether the order in which a sequence of transformations is performed will affect the final location of the image.

SAMPLE PROBLEM (From Lesson 10)

This image shows a sequence of transformations performed on Object E .



To create Object E_1 , translate (slide) Object E along the vector from point $(1, 0)$ on the coordinate plane/grid to point $(-1, 1)$. (NOTE: Students can also explain this translation on the coordinate plane as 1 up and 2 left.)

To create Object E_2 , rotate (turn) Object E_1 around point $(-1, 1)$ 90° . Notice that the rotation is in the counterclockwise direction.

To create Object E_3 , reflect (flip) Object E_2 across line L .

Additional sample problems with detailed answer steps are found in the *Eureka Math Homework Helpers* books. Learn more at GreatMinds.org.

HOW YOU CAN HELP AT HOME

Many of the activities that you and your child worked on during Topic A will still be useful in Topic B. Here are some other ideas for you to help your child at home.

- If your child is having trouble identifying each type of transformation, try demonstrating the three types with refrigerator magnets. Discuss what happened to the corners and/or edges of the magnet after each transformation. Are they in a new location? For example, suppose you labeled the upper left corner point A and the upper right corner point B . Is point A still to the left of point B after the reflection? Considering these questions may help your child understand that you have literally flipped the object and that the labels on the points of a flipped image will not be in the same order as on the original. Have these same conversations about translations and rotations as well.
- Sentence starters are a great way to help your child understand exactly which language to use for each transformation. For now, provide your child with a copy of each sentence exactly as it appears below. Have your child fill in the blanks. As your child begins to master the language, remove the hints that appear in parentheses, and have your child once again fill in the blanks. For example, you would now provide the starter *Translate* ___ *using* ___. Eventually, your child should be able to complete each sentence with only the first word as a starter (e.g., *Translate* ___) and then without starters.

Translate ___ (object name) using ___ (vector name).

Reflect ___ (object name) across the line ___ (line name).

Rotate ___ (object name) around point ___ (point name) ___ (number) degrees.

TERMS

Sequence of transformations: A set of transformations performed in a particular order (e.g., a translation followed by a rotation).