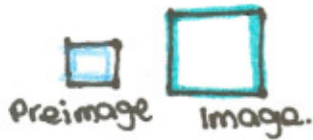


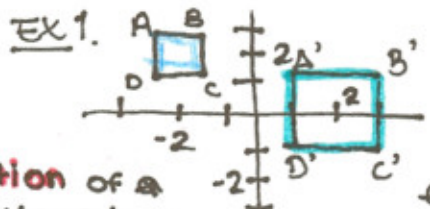
Ch.9 :

TRANSLATIONS TRANSFORMATIONS

The original figure is the **preimage**. The resulting figure is an **image**. An **isometry** is a transformation in which the preimage and image are congruent!



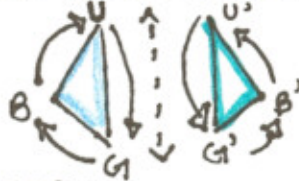
A **translation** (or slide) is an isometry that maps all points of a figure the same distance in the same direction.



(x, y)
 $(x+4, y-2)$ REFLECTIONS

A **composition** of transformations is a combination of two or more transformations.

A **reflection** (or flip) is an isometry in which a figure and its image have opposite orientation.



Rotations (use counterclockwise)

To describe a **rotation**, you need to know the center of rotation (a point), the angle of rotation (a positive # of degrees), and whether rotation is clockwise or counter clockwise.

ex. Name image of \bar{E} for a 72° rotation about X .



Symmetry

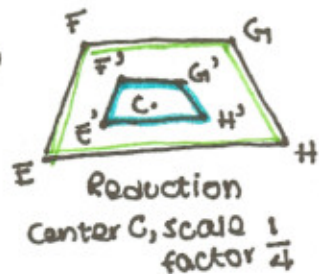
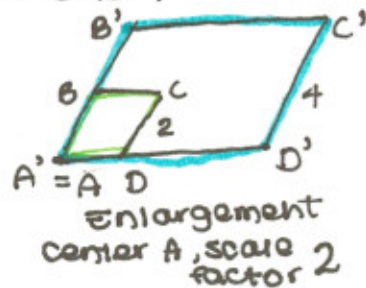
A figure has **symmetry** if there is an isometry that maps the figure onto itself. If the isometry is the reflection of a plane figure, the figure has **reflectional symmetry** or **line symmetry**.

A figure that has **rotational symmetry** is its own image for some rotation of 180° or less. A figure that has **point symmetry** has 180° rotational symmetry, with the center of rotation at the center of the square.



Dilations

A **dilation** is a transformation whose preimage and image are similar. The dilation is an **enlargement** if the scale factor is greater than 1. The dilation is a **reduction** if the scale factor is between 0 and 1.



Compositions of Reflections

- 9-1 - A translation or rotation is a composition of two reflections.
- 9-2 - A composition of reflections across two parallel lines is a translation
- 9-3 - A composition of reflections across two intersecting lines is a rotation.
- 9-4 - In a plane, one of two congruent figures can be mapped onto the other by a composition of at most three reflections.

A **glide reflection** is the composition of a glide (translation) and a reflection across a line parallel to the direction of translation.

Isometry Classification Theorem

There are only four isometries. They are the following.

