

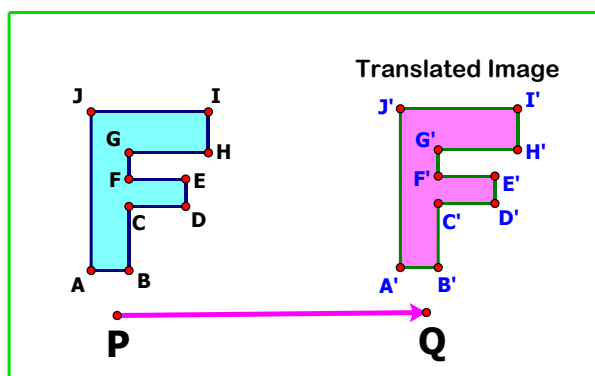
Discovering Transformations using GSP: The Geometer's Sketchpad

A Transformation is a way of moving or changing a figure. There are three types of basic transformations that preserve the size and shape of the figure, namely.

- Translation
- Reflection
- Rotation

Activity 1: Sketch and Investigation: Translations

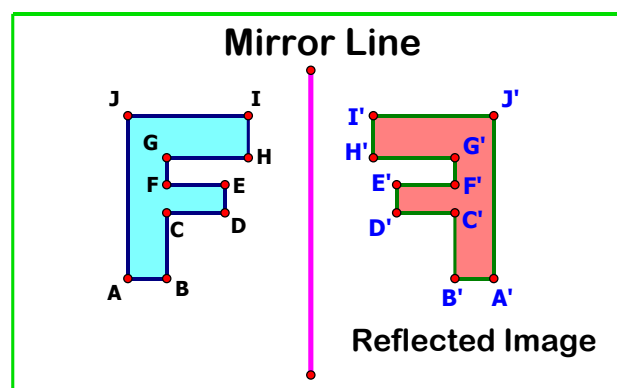
- Step 1:** Open a new sketch and construct a many-sided polygon
- Go to the file menu and choose New sketch
 - Use the point tool to construct points ABCDEFGHIJ with many sides as shown.
- Step 2:** Construct polygon interior
- Click on the selection arrow tool and select points ABCDEFGHIJ in order
 - Go to *Construct menu* and select *Polygon Interior*
- Step 3:** In order to translate a shape, we need to indicate a direction and distance as follows:
- Construct segment **PQ**
 - Select in order from point **P** to point **Q**
 - Go to *Transform menu* and select **Mark vector**
- Step 4:** Click inside the interior of the polygon
- Go to the *Transform menu* and select **Translate**
- Step 5:** Change the color of the translated image
- Double click the polygon interior with **Text tool** and label the translated polygon “*Translated image*”
- Step 6:** Drag point B to change your vector, and observe the relationship between the translated image and the original figure.



Question: Compare the **translated image** to the original figure. How are they different and how are they the same?

Activity 2 Sketch and Investigation: Reflections

- Step 1:** Open a new sketch and construct a many-sided polygon
- Go to the file menu and choose New sketch
 - Use the point tool to construct many points with many sides as shown.
- Step 2:** Construct polygon interior
- Click on the selection arrow tool and select points in order
 - Go to *Construct menu* and select *Polygon Interior*
- Step 3:** To reflect a shape you need a mirror line
- Draw a line and label it **Mirror line**;
 - Mark the line as a mirror by double-click the line
- Step 4:** Select the interior polygon and go to *Transform menu* then select **Reflect**;
- Step 5:** Reflect the original polygon interior and change the color of the reflected image. Label it **Reflected image**;
- Step 6:** Drag your mirror line, and observe the relationship between the reflected image and the original figure.



Question: Compare the **reflected image** to the original figure. How are they different and how are they the same?

Activity 3: Sketch and Investigation: Rotations

Step 1: Open a new sketch and construct a polygon ABCDEFGHIJ

- Go to the file menu and choose New sketch
- Use the **point tool** to construct a polygon ABCDEFGHIJ as shown.

Step 2: Construct several polygon interior

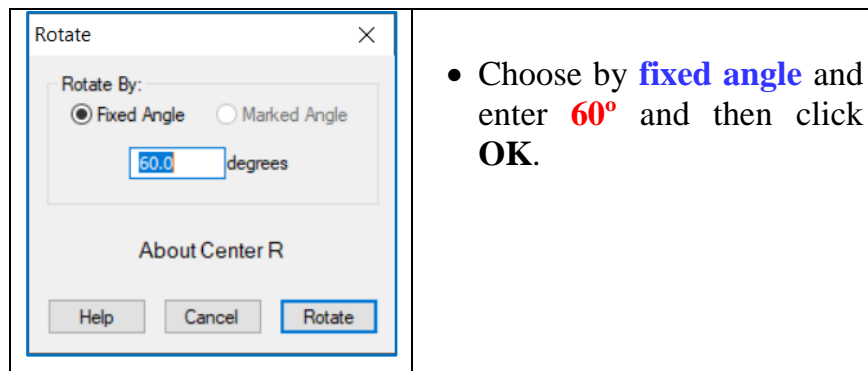
- Click on the selection arrow tool and select points in order or using Marquee selection
- Go to *Construct menu* and select *Polygon Interior*

Step 3: Construct point **R**, and segment **AR**:

- Select **point R** and segment **AR**;
- Go to the **Transform menu** and choose **Mark Center** or double click at **point R**.

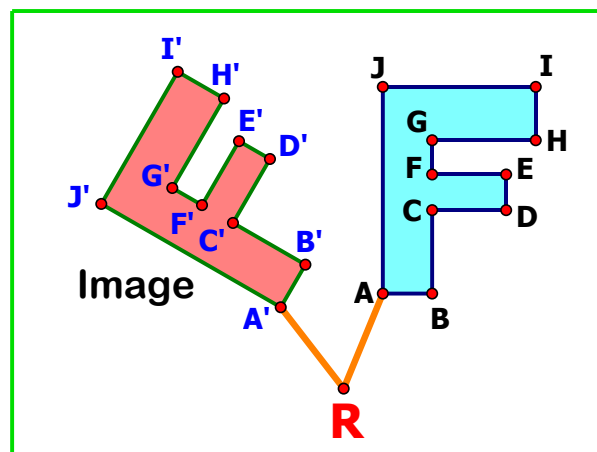
Step 4: Click on the selection arrow tool and use a selection marquee to select polygon ABCDEFGHIJ.

- Go to *Transform menu* and choose **Rotate**;



- Choose by **fixed angle** and enter **60°** and then click **OK**.

Step 5: Rotate the original polygon interior and change the color of the image as shown.



Question: Compare the **translated image** to the original figure. How are they different and how are they the same?

