

# Rotations with Patty Paper

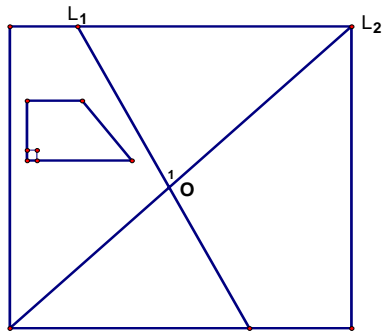


FIG. 1

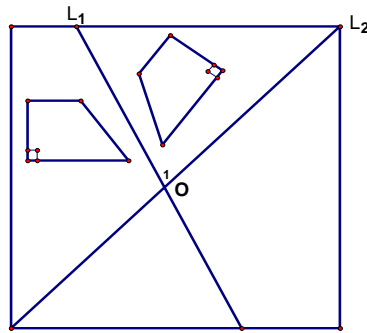


FIG. 2

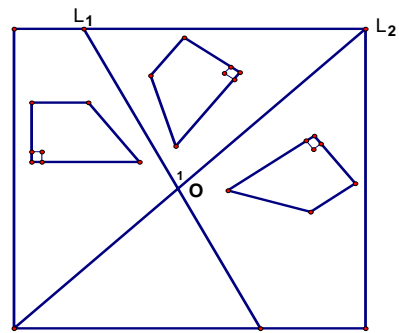


FIG. 3

## Instructions:

1. Draw two intersecting lines on a piece of patty paper as shown above in figure 1. Also draw a quadrilateral in the left section of the paper.
2. Reflect the quadrilateral over line  $L_1$  as shown in figure 2 above.
3. Reflect this image line  $L_2$  as shown in figure 3 above.
4. Use a protractor and measure  $\angle 1$ .
5. Connect the point of intersection of  $L_1$  and  $L_2$  to the vertex of the right angle of the original quadrilateral in figure 3. Label this vertex point P.
6. Place a second piece of patty paper on top of the first so that the sides match.
7. Trace  $L_1$ ,  $L_2$ , the original quadrilateral, and the segment drawn in #5 onto the top sheet of patty paper.
8. With the end of a sharp pencil on point O, rotate the top sheet until the quadrilateral coincides with its final image.
9. Connect O to the vertex of the right angle (final image) on the first sheet of patty paper. Label the vertex of the final image point P'.

## Observations:

10. What has changed from the pre-image to the image in this rotation? What has remained the same?
11. Use a protractor to measure  $\angle POP'$  and  $\angle 1$ . How do these measures compare?
12. Make a conjecture about the angle of rotation ( $\angle POP'$ ) and the angle formed by the two intersecting lines  $L_1$  and  $L_2$ .
13. What properties have been preserved with rotation?
14. Is a rotation an isometry? Explain.
15. How would you describe a rotation based upon this exploration?