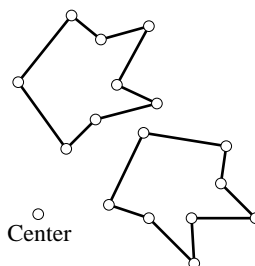





Exploring Rotations





1. Open a new sketch.
 2. Construct a polygon (use the Segment tool ). This figure is your preimage.
- Use Sketchpad to rotate your polygon.
3. Construct a point near your polygon (use the Point tool ).
 4. While this point is selected, go to the **Transform** menu and choose **Mark Center**.
 5. Select the sides and vertices of your polygon (use the Selection Arrow tool ).
 6. Go to the **Transform** menu and choose **Rotate**.
 7. Choose **By Fixed Angle**.
 8. Enter an angle measure.
 9. Click on **OK**. This new figure is your image.
 10. Drag any vertex or side of your preimage. Observe the effects on the image.
 11. Go to the **Edit** menu and choose **Undo** until you see only your original preimage.
 12. Repeat steps 5, 6, 7, 8, and 9, entering different values for the angle of rotation. You may want to use some negative values. Observe the results.
 13. Drag your figure again and make observations.
 14. Based on your observations, define *rotation*. Include the relationship between sizes, shapes, and locations of the preimage and image.

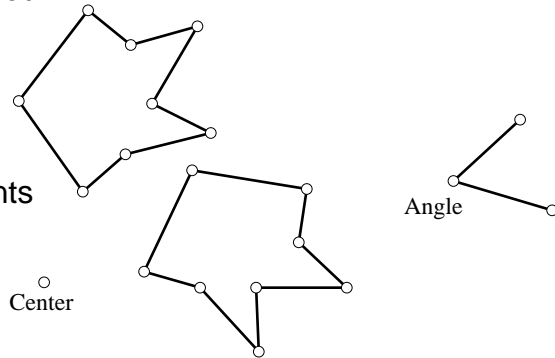
 15. Drag the point you marked as your center of rotation. Make observations. Use your observations to define a *center of rotation*.

Alternate Method for Rotations

16. Go to the **Edit** menu and choose **Undo** until you see only your original preimage.

17. Construct an angle in your sketch (use the Segment tool ).

18. Hold down the Shift key, and click on the points that define the angle, in clockwise or counterclockwise order. Make sure the vertex of the angle is the second point you choose (use the Selection Arrow tool ).



19. Go to the **Transform** menu and choose **Mark Angle**.

20. Select the sides and angles of your polygon (use the Selection Arrow tool ).

21. Go to the **Transform** menu and choose **Rotate**.

22. Choose **By Marked Angle**.

23. Click on **OK**. You should see a new image appear.

24. Drag one of the points defining your angle of rotation. Observe the image as you drag. How does this affect the size, shape, and position of the image?

25. Drag one of the vertices of the preimage. How does this affect the size, shape, and position of the image?

26. How is the effect of changing the angle of rotation different from the effect of changing the preimage?

27. Compare the two methods you have learned for rotating a figure.
