Lesson 5: Definition of Rotation and Basic Properties

Classwork

Exercises

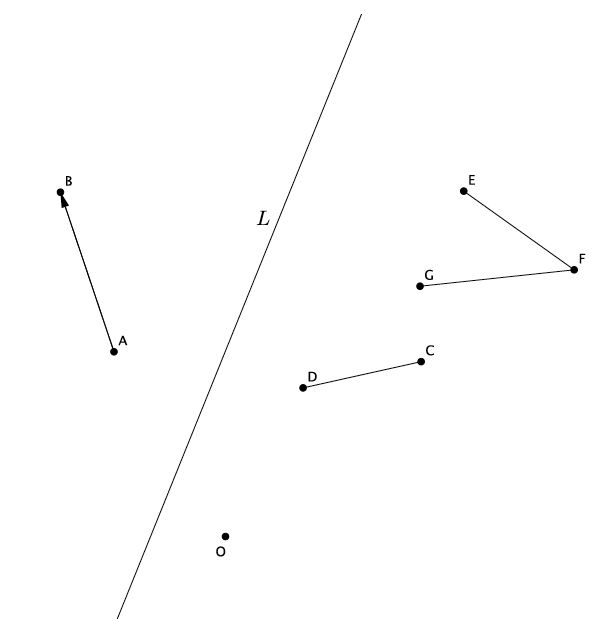
1. Letthere be a rotation of degrees around center . Let be a point other than . Select so that . Find (i.e., the rotation of point ) using a transparency.



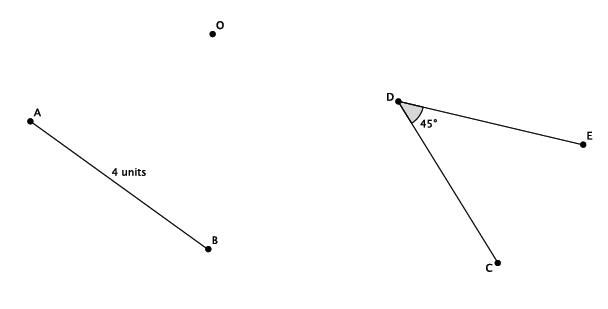
1. Let there be a rotation of degrees around center . Let be a point other than . Select so that . Find (i.e., the rotation of point )using a transparency.



1. Which direction did the point rotate when ?
2. Which direction did the point rotate when ?
3. Let be a line, be a ray, be a segment, and be an angle, as shown. Let therebe a rotation of degrees around point . Find the images of all figures when .

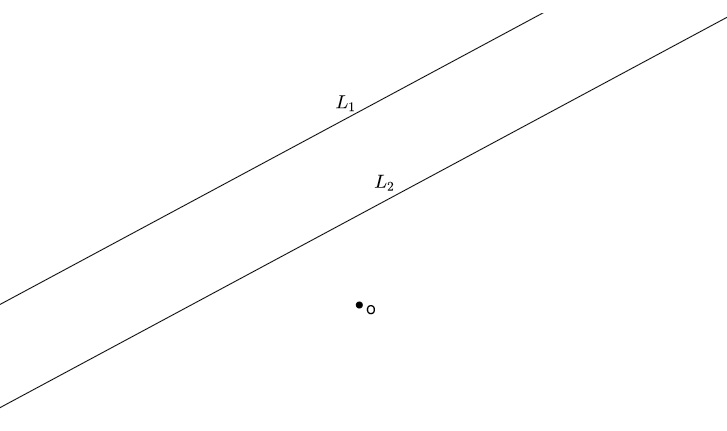


1. Let be a segment of length units and be an angle of size . Let therebe a rotation by degrees, where , about *.* Find the images of the given figures. Answer the questions that follow.

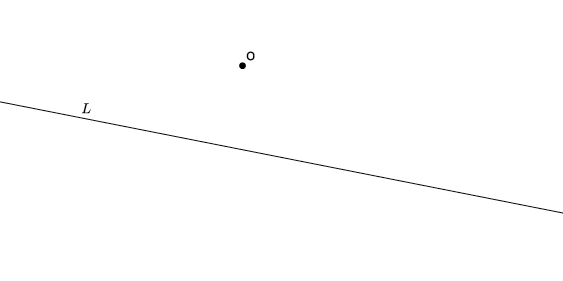


* 1. What is the length of the rotated segment ?
  2. What is the degree of the rotated angle ?

1. Let and be parallel lines. Let there be a rotation by degrees, where , about .   
   Is ?



1. Let be a line and be the center of rotation. Let there be a rotation by degrees, where about *.* Are the lines and parallel?



Lesson Summary

Rotations require information about the center of rotation and the degree in which to rotate. Positive degrees of rotation move the figure in a counterclockwise direction. Negative degrees of rotation move the figure in a clockwise direction.

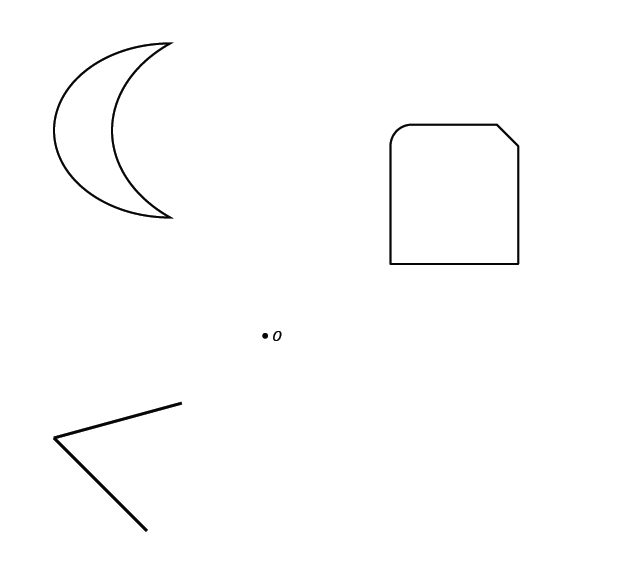
Basic Properties of Rotations:

* (Rotation 1) A rotation maps a line to a line, a ray to a ray, a segment to a segment, and an angle to an angle.
* (Rotation 2) A rotation preserves lengths of segments.
* (Rotation 3) A rotation preserves measures of angles.

When parallel lines are rotated, their images are also parallel. A line is only parallel to itself when rotated exactly .

Problem Set

1. Let therebe arotation by around the center *.*



1. Explain why a rotation of degrees around any point never maps a line to a line parallel to itself.
2. A segment of length cm has been rotated degrees around a center . What is the length of the rotated segment? How do you know?
3. An angle of size has been rotated degrees around a center *.* What is the size of the rotated angle? How do you know?