Lesson Summary

- A rotation of 180 degrees around O is the rigid motion so that if P is any point in the plane, P, O, and Rotation(P) are collinear (i.e., lie on the same line).
- Given a 180-degree rotation, \( R_0 \) around the origin O of a coordinate system, \( R_0 \), and a point P with coordinates \( (a, b) \), it is generally said that \( R_0(P) \) is the point with coordinates \( (-a, -b) \).

**Theorem:** Let O be a point not lying on a given line \( L \). Then, the 180-degree rotation around O maps \( L \) to a line parallel to \( L \).

Problem Set

Use the following diagram for Problems 1–5. Use your transparency as needed.

1. Looking only at segment \( BC \), is it possible that a 180° rotation would map segment \( BC \) onto segment \( B'C' \)? Why or why not?

2. Looking only at segment \( AB \), is it possible that a 180° rotation would map segment \( AB \) onto segment \( A'B' \)? Why or why not?
3. Looking only at segment $AC$, is it possible that a $180^\circ$ rotation would map segment $AC$ onto segment $A'C'$? Why or why not?

4. Connect point $B$ to point $B'$, point $C$ to point $C'$, and point $A$ to point $A'$. What do you notice? What do you think that point is?

5. Would a rotation map triangle $ABC$ onto triangle $A'B'C'$? If so, define the rotation (i.e., degree and center). If not, explain why not.

6. The picture below shows right triangles $ABC$ and $A'B'C'$, where the right angles are at $B$ and $B'$. Given that $AB = A'B' = 1$, and $BC = B'C' = 2$, and that $\overline{AB}$ is not parallel to $\overline{A'B'}$, is there a $180^\circ$ rotation that would map $\triangle ABC$ onto $\triangle A'B'C'$? Explain.