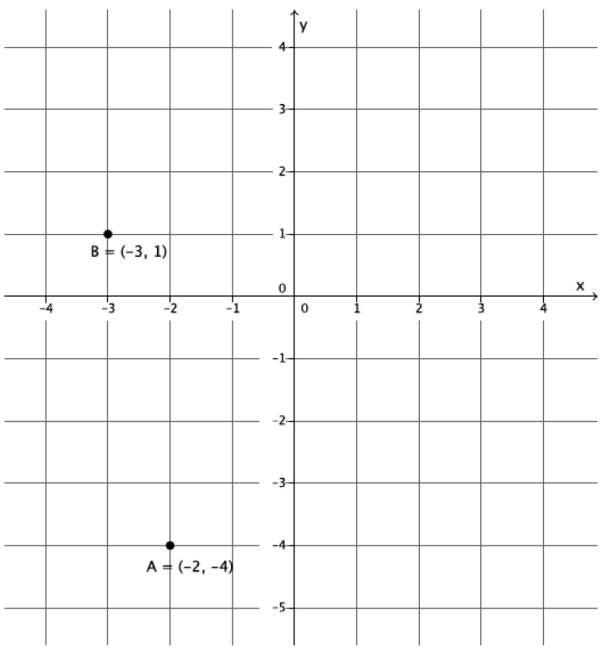
Name _____ Date _____

Rotations of 180 Degrees

Let there be a rotation of 180 degrees about the origin. Point A has coordinates $(-2, -4)$, and point B has coordinates $(-3, 1)$, as shown below.

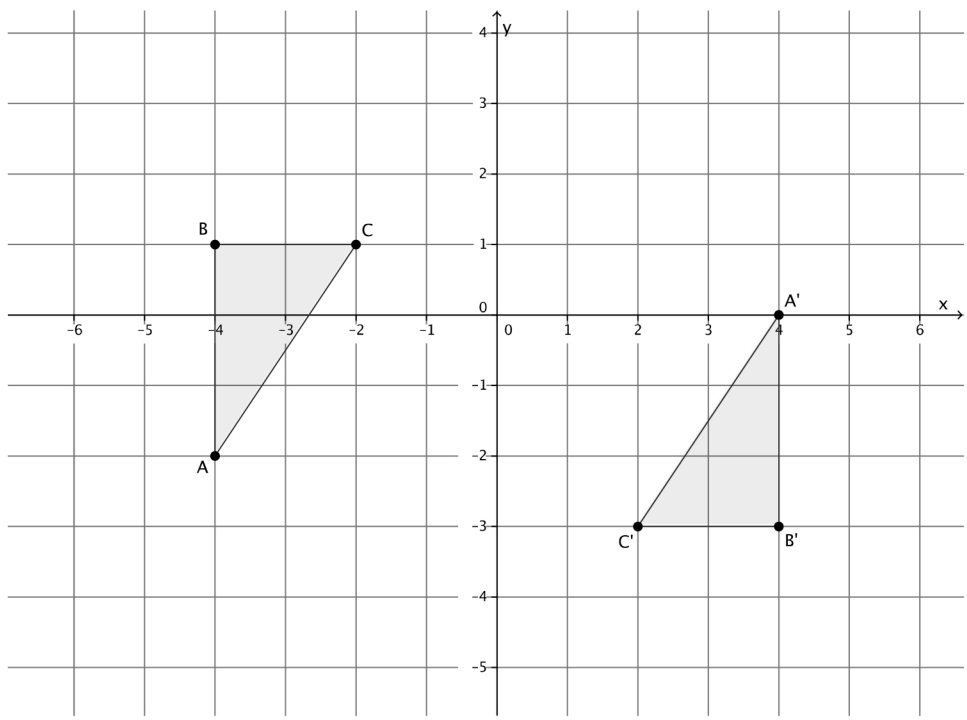


1. What are the coordinates of $Rotation(A)$? Mark that point on the graph so that $Rotation(A) = A'$. What are the coordinates of $Rotation(B)$? Mark that point on the graph so that $Rotation(B) = B'$.

2. What can you say about the points A, A', and O? What can you say about the points B, B', and O?

3. Connect point A to point B to make the line L_{AB}. Connect point A' to point B' to make the line $L_{A'B'}$. What is the relationship between L_{AB} and $L_{A'B'}$?

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 BC onto $B'C'$? Why or why not?

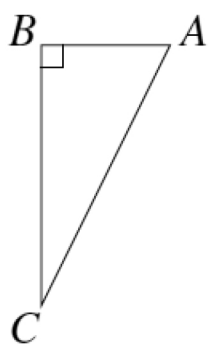
2. Looking only at segment AB, is it possible that a $180°$ rotation would map AB onto $A'B'$? Why or why not?

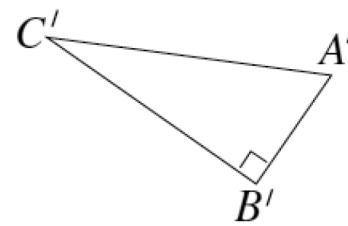
3. Looking only at segment AC, is it possible that a $180°$ rotation would map AC onto $A'C'$? Why or why not?

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?

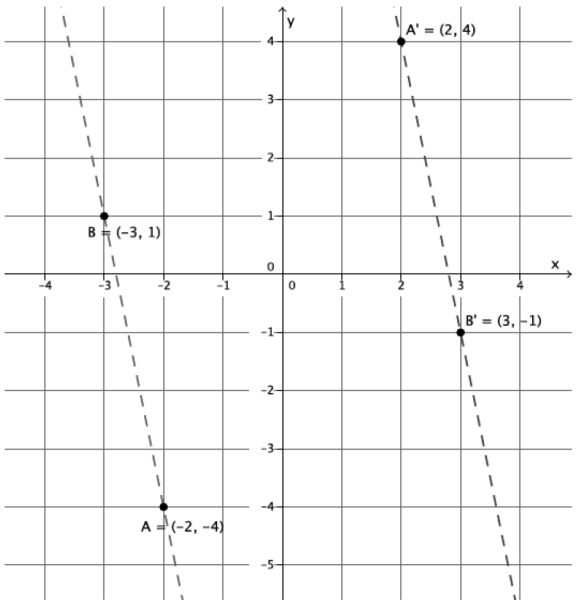
5. Would a rotation map triangle ABC onto triangle $'B'C'$? If so, define the rotation (i.e., degree and center). If not, explain why not.

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 AB is not parallel to $A'B'$, is there a $180°$ rotation that would map ΔABC onto $\triangle A'B'C'$? Explain.





Let there be a rotation of 180 degrees about the origin. Point A has coordinates $(-2, -4)$, and point B has coordinates $(-3, 1)$, as shown below.



1. What are the coordinates of $Rotation(A)$? Mark that point on the graph so that $Rotation(A) = A'$. What are the coordinates of $Rotation(B)$? Mark that point on the graph so that $Rotation(B) = B'$.

   $A' = (2, 4)$, $B' = (3, -1)$

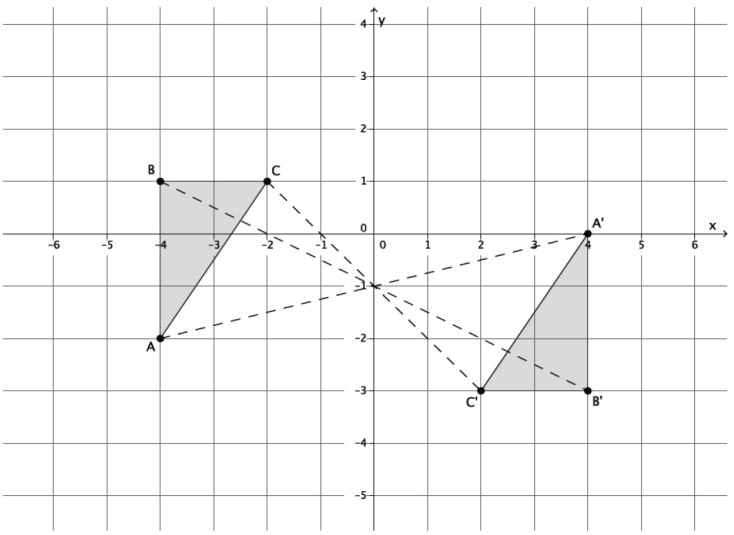
2. What can you say about the points A, A', and O? What can you say about the points B, B', and O?

   The points A, A', and O are collinear. The points B, B', and O are collinear.

3. Connect point A to point B to make the line L_{AB}. Connect point A' to point B' to make the line $L_{A'B'}$. What is the relationship between L_{AB} and $L_{A'B'}$?

   $L_{AB} \parallel L_{A'B'}$.

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 BC onto $B'C'$? Why or why not?**

   It is possible because the segments are parallel.

2. **Looking only at segment AB, is it possible that a $180°$ rotation would map AB onto $A'B'$? Why or why not?**

   It is possible because the segments are parallel.

3. **Looking only at segment AC, is it possible that a $180°$ rotation would map AC onto $A'C'$? Why or why not?**

   It is possible because the segments are parallel.

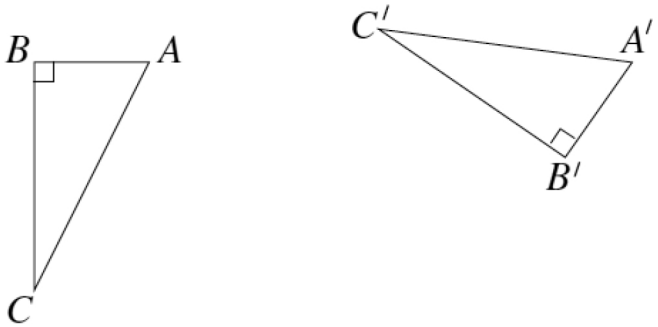
4. **Connect point B to point B', point C to point C', and point A to point A'. What do you notice? What do you think that point is?**

   All of the lines intersect at one point. The point is the center of rotation, I checked by using my transparency.

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.**

   Let there be a rotation $180°$ around point $(0, -1)$. Then, $Rotation(\Delta ABC) = \Delta A'B'C'$.

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 AB is not parallel to $A'B'$, is there a $180°$ rotation that would map $\triangle ABC$ onto $\triangle A'B'C'$? Explain.**



No, because a $180°$ rotation of a segment will map to a segment that is parallel to the given one. It is given that AB is not parallel to $A'B'$; therefore, a rotation of $180°$ will not map $\triangle ABC$ onto $\triangle A'B'C'$.