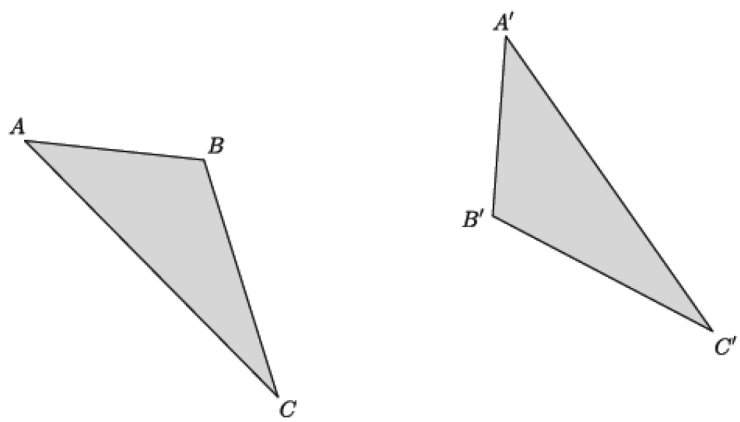
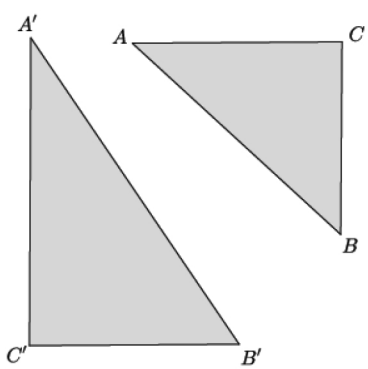
Name _____ Date _____

Definition of Congruence and Some Basic Properties

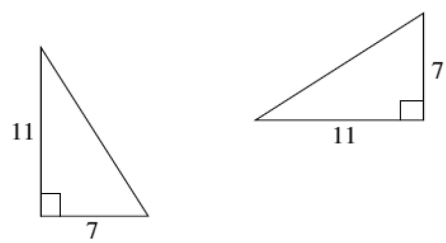
1. Is $\triangle ABC \cong \triangle A'B'C'$? If so, describe a sequence of rigid motions that proves they are congruent. If not, explain how you know.



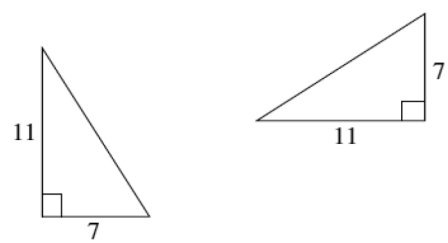
2. Is $\triangle ABC \cong \triangle A'B'C'$? If so, describe a sequence of rigid motions that proves they are congruent. If not, explain how you know.



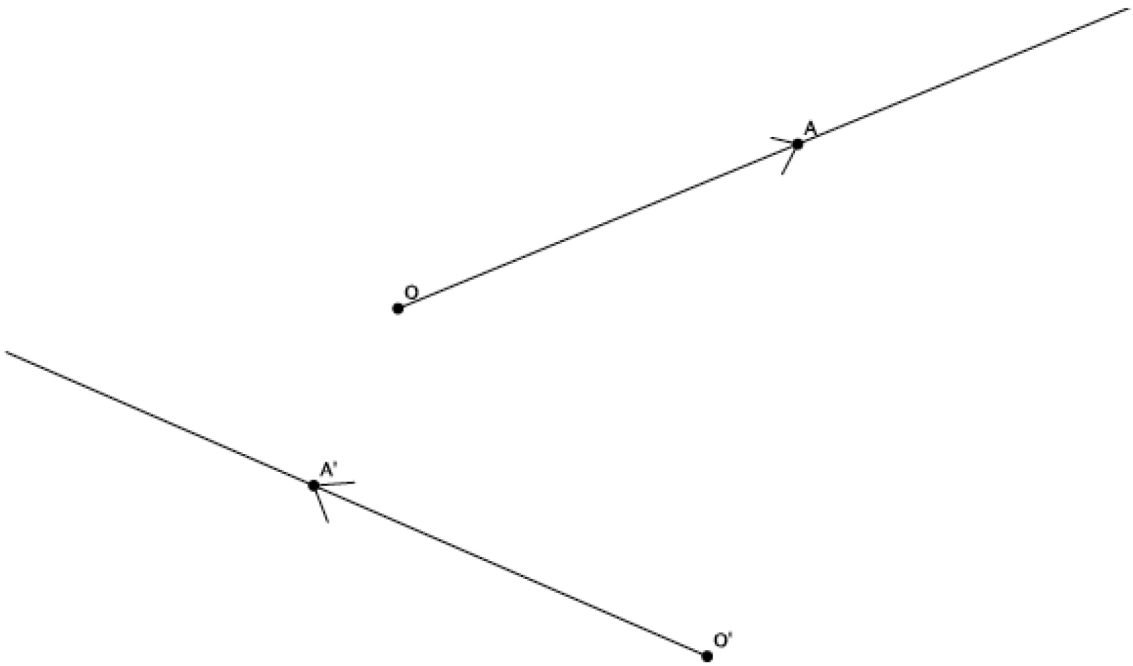
1. Given two right triangles with lengths shown below, is there one basic rigid motion that maps one to the other? Explain.



2. Are the two right triangles shown below congruent? If so, describe a congruence that would map one triangle onto the other.



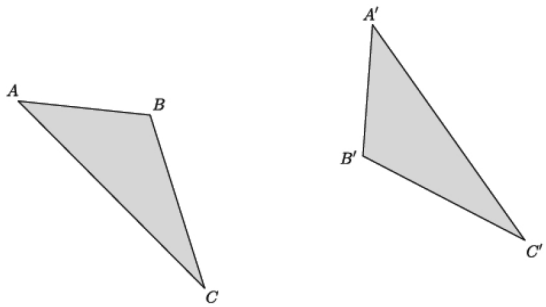
3. Given two rays, $\overrightarrow{OA}$ and $\overrightarrow{O'A'}$:



a. Describe a congruence that maps $\overrightarrow{OA}$ to $\overrightarrow{O'A'}$.

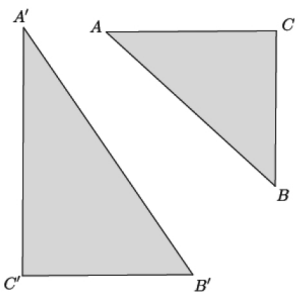
b. Describe a congruence that maps $\overrightarrow{O'A'}$ to $\overrightarrow{OA}$.

1. **Is $\triangle ABC \cong \triangle A'B'C'$? If so, describe a sequence of rigid motions that proves they are congruent. If not, explain how you know.**



Sample student response: Yes, $\triangle ABC \cong \triangle A'B'C'$. Translate $\triangle A'B'C'$ along vector $\overrightarrow{A'A}$. Rotate $\triangle A'B'C'$ around center A, d degrees until side $A'C'$ coincides with side AC. Then, reflect across line AC.

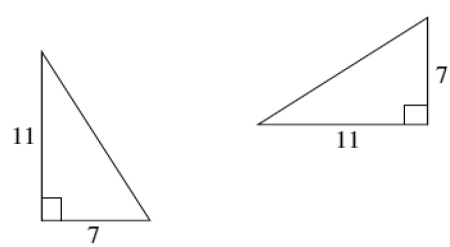
2. **Is $\triangle ABC \cong \triangle A'B'C'$? If so, describe a sequence of rigid motions that proves they are congruent. If not, explain how you know.**



Sample student response: No, $\triangle ABC$ is not congruent to $\triangle A'B'C'$. Though I could translate and rotate to get some of the parts from each triangle to coincide, there is no rigid motion that would map side $A'C'$ to AC or side $A'B'$ to side AB, because they are different lengths. Basic rigid motions preserve length, so no sequence would map $\triangle A'B'C'$ onto $\triangle ABC$.

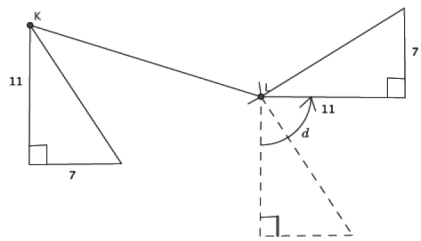
Students practice describing sequences of rigid motions that produce a congruence.

1. **Given two right triangles with lengths shown below, is there one basic rigid motion that maps one to the other? Explain.**



Yes, a rotation of d degrees around some center would map one triangle onto the other. The rotation would map the right angle to the right angle; the sides of length 7 and length 11 would then coincide.

2. **Are the two right triangles shown below congruent? If so, describe a congruence that would map one triangle onto the other.**

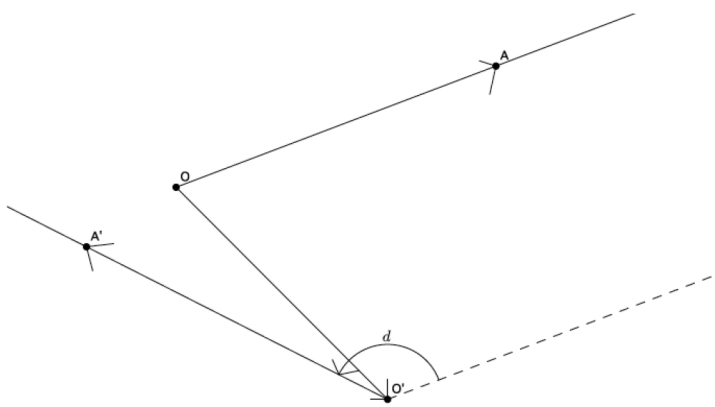


Sample student response: Yes, they are congruent. Let there be the translation along vector $\overrightarrow{KL}$. Let there be the rotation around point L, d degrees. Then, the translation followed by the rotation will map the triangle on the left to the triangle on the right.

3. **Given two rays, $\overrightarrow{OA}$ and $\overrightarrow{O'A'}$:**

a. **Describe a congruence that maps $\overrightarrow{OA}$ to $\overrightarrow{O'A'}$.**

Sample student response: Let there be the translation along vector $\overrightarrow{OO'}$. Let there be the rotation around point O', d degrees. Then, the $Translation(\overrightarrow{OA})$ followed by the $Rotation = \overrightarrow{O'A'}$.



b. **Describe a congruence that maps $\overrightarrow{O'A'}$ to $\overrightarrow{OA}$.**

Sample student response: Let there be the translation along vector $\overrightarrow{O'O}$. Let there be the rotation around point O, d_1 degrees. Then, the $Translation\ (\overrightarrow{O'A'})$ followed by the $Rotation = \overrightarrow{OA}$.