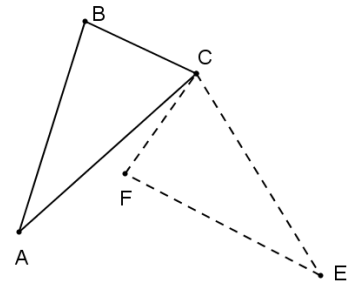


## Lesson 21: Correspondence and Transformations

### Classwork

#### Opening Exercise

The figure to the right represents a rotation of  $\triangle ABC$   $80^\circ$  around vertex  $C$ . Name the triangle formed by the image of  $\triangle ABC$ . Write the rotation in function notation, and name all corresponding angles and sides.

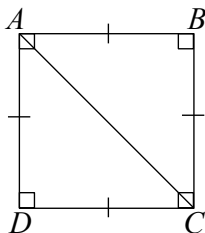


#### Discussion

In the Opening Exercise, we explicitly showed a single rigid motion, which mapped every side and every angle of  $\triangle ABC$  onto  $\triangle EFC$ . Each corresponding pair of sides and each corresponding pair of angles was congruent. When each side and each angle on the pre-image maps onto its corresponding side or angle on the image, the two triangles are congruent. Conversely, if two triangles are congruent, then each side and angle on the pre-image is congruent to its corresponding side or angle on the image.

#### Example 1

$ABCD$  is a square, and  $AC$  is one diagonal of the square.  $\triangle ABC$  is a reflection of  $\triangle ADC$  across segment  $AC$ . Complete the table below identifying the missing corresponding angles and sides.



Corresponding angles	Corresponding sides
$\angle BAC \rightarrow$	$AB \rightarrow$
$\angle ABC \rightarrow$	$BC \rightarrow$
$\angle BCA \rightarrow$	$AC \rightarrow$

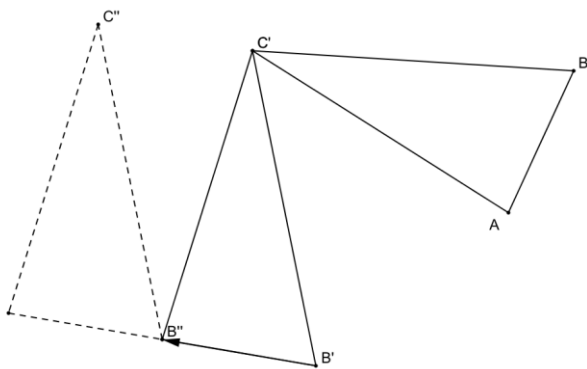
- a. Are the corresponding sides and angles congruent? Justify your response.

b. Is  $\triangle ABC \cong \triangle ADC$ ? Justify your response.

**Exercises 1–3**

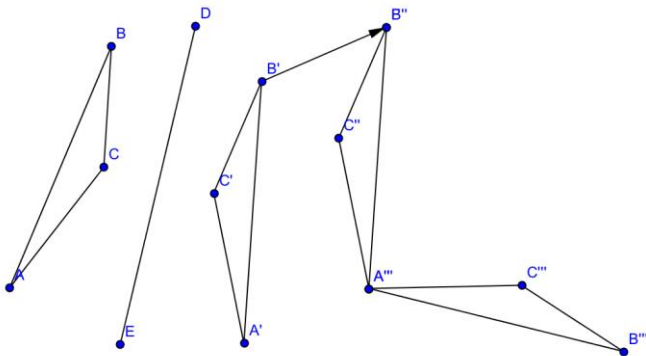
Each exercise below shows a sequence of rigid motions that map a pre-image onto a final image. Identify each rigid motion in the sequence, writing the composition using function notation. Trace the congruence of each set of corresponding sides and angles through all steps in the sequence, proving that the pre-image is congruent to the final image by showing that every side and every angle in the pre-image maps onto its corresponding side and angle in the image. Finally, make a statement about the congruence of the pre-image and final image.

1.



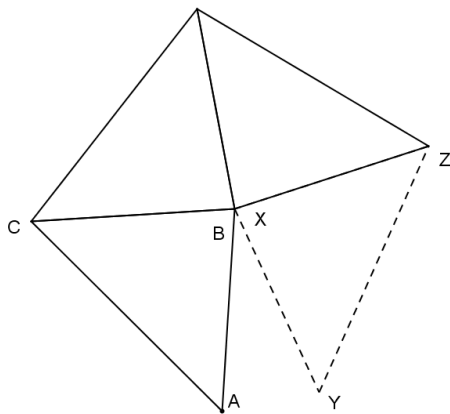
Sequence of rigid motions (2)	
Composition in function notation	
Sequence of corresponding sides	
Sequence of corresponding angles	
Triangle congruence statement	

2.



Sequence of rigid motions (3)	
Composition in function notation	
Sequence of corresponding sides	
Sequence of corresponding angles	
Triangle congruence statement	

3.



Sequence of rigid motions (3)	
Composition in function notation	
(Sequence of corresponding sides)	
Sequence of corresponding angles	
Triangle congruence statement	

**Problem Set**

1. Exercise 3 above mapped  $\triangle ABC$  onto  $\triangle YXZ$  in three “steps.” Construct a fourth step that would map  $\triangle YXZ$  back onto  $\triangle ABC$ .
2. Explain triangle congruence in terms of rigid motions. Use the terms corresponding sides and corresponding angles in your explanation.