

## Lesson 5: Identical Triangles

### Classwork

#### Opening

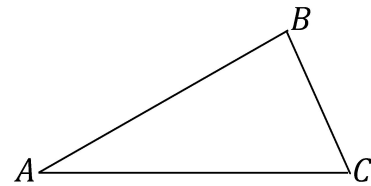
When studying triangles, it is essential to be able to communicate about the parts of a triangle without any confusion. The following terms are used to identify particular angles or sides:

- between
- adjacent to
- opposite to
- included [side/angle]

#### Exercises 1–7

Use the figure  $\triangle ABC$  to fill in the following blanks.

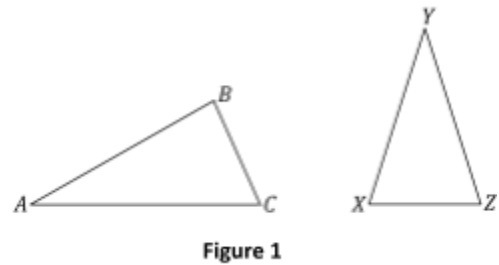
1.  $\angle A$  is \_\_\_\_\_ sides  $\overline{AB}$  and  $\overline{AC}$ .
2.  $\angle B$  is \_\_\_\_\_ side  $\overline{AB}$  and to side  $\overline{BC}$ .
3. Side  $\overline{AB}$  is \_\_\_\_\_  $\angle C$ .
4. Side \_\_\_\_\_ is the included side of  $\angle B$  and  $\angle C$ .
5.  $\angle$  \_\_\_\_\_ is opposite to side  $\overline{AC}$ .
6. Side  $\overline{AB}$  is between  $\angle$  \_\_\_\_\_ and  $\angle$  \_\_\_\_\_.
7. What is the included angle of sides  $\overline{AB}$  and  $\overline{BC}$



**Example 1**

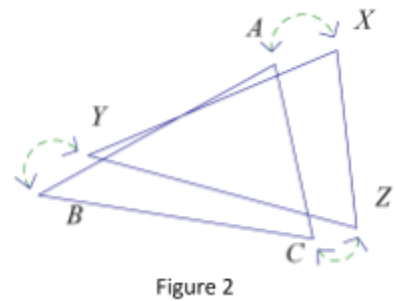
Given the following triangle correspondences, use double arrows to show the correspondence between vertices, angles, and sides.

Triangle Correspondence	$\triangle ABC \leftrightarrow \triangle STR$
Correspondence of Vertices	
Correspondence of Angles	
Correspondence of Sides	



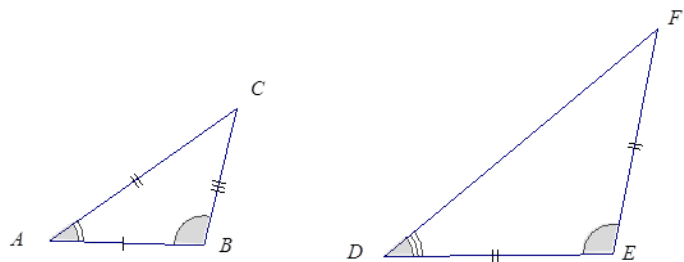
Examine Figure 2. By simply looking, it is impossible to tell the two triangles apart unless they are labeled. They look exactly the same (just as identical twins look the same). One triangle could be picked up and placed on top of the other.

Two triangles are identical if there is a triangle correspondence so that corresponding sides and angles of each triangle are equal in measurement. In Figure 2, there is a correspondence that will match up equal sides and equal angles,  $\triangle ABC \leftrightarrow \triangle XYZ$ ; we can conclude that  $\triangle ABC$  is identical to  $\triangle XYZ$ . This is not to say that we cannot find a correspondence in Figure 2 so that unequal sides and unequal angles are matched up, but there certainly is one correspondence that will match up angles with equal measurements and sides of equal lengths, making the triangles identical.



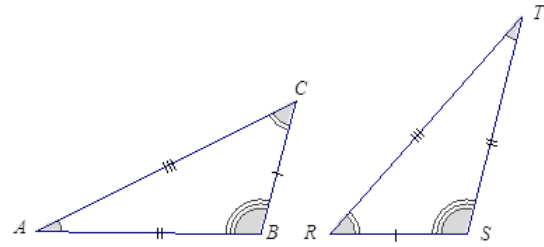
In discussing identical triangles, it is useful to have a way to indicate those sides and angles that are equal. We mark sides with tick marks and angles with arcs if we want to draw attention to them. If two angles or two sides have the same number of marks, it means they are equal.

In this figure,  $AC = DE = EF$ , and  $\angle B = \angle E$ .



**Example 2**

Two identical triangles are shown below. Give a triangle correspondence that matches equal sides and equal angles.



**Problem Set**

Given the following triangle correspondences, use double arrows to show the correspondence between vertices, angles, and sides.

1.

Triangle Correspondence	$\triangle ABC \leftrightarrow \triangle RTS$
Correspondence of Vertices	
Correspondence of Angles	
Correspondence of Sides	

2.

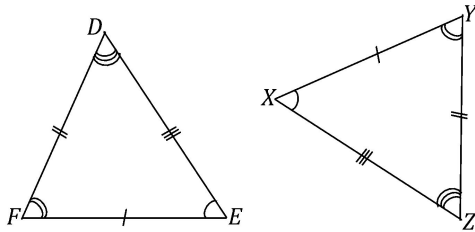
Triangle Correspondence	$\triangle ABC \leftrightarrow \triangle FGE$
Correspondence of Vertices	
Correspondence of Angles	
Correspondence of Sides	

3.

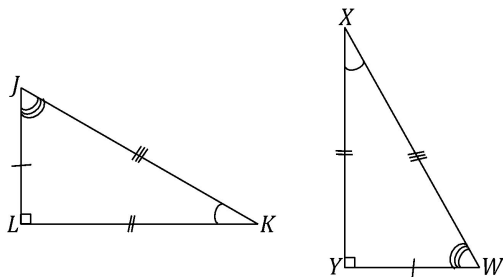
Triangle Correspondence	$\triangle QRP \leftrightarrow \triangle WYX$
Correspondence of Vertices	
Correspondence of Angles	
Correspondence of Sides	

Name the angle pairs and side pairs to find a triangle correspondence that matches sides of equal length and angles of equal measurement.

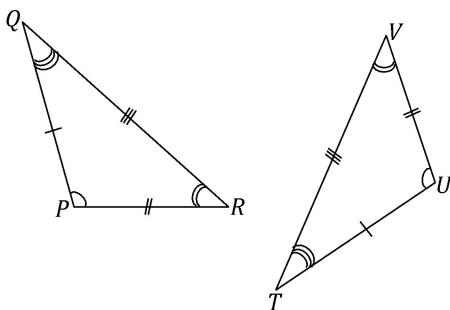
4.



5.

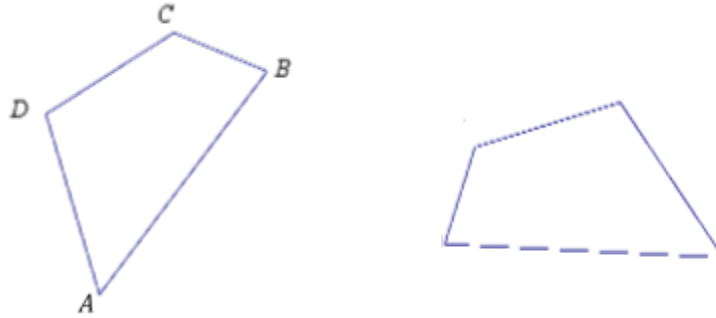


6.



7. Quadrilateral  $ABCD$  is identical with quadrilateral  $WXYZ$  with a correspondence  $A \leftrightarrow W$ ,  $B \leftrightarrow X$ ,  $C \leftrightarrow Y$ , and  $D \leftrightarrow Z$ .

a. In the figure below, label points  $W$ ,  $X$ ,  $Y$ , and  $Z$  on the second quadrilateral.



b. Set up a correspondence between the side lengths of the two quadrilaterals that matches sides of equal length.

c. Set up a correspondence between the angles of the two quadrilaterals that matches angles of equal measure.