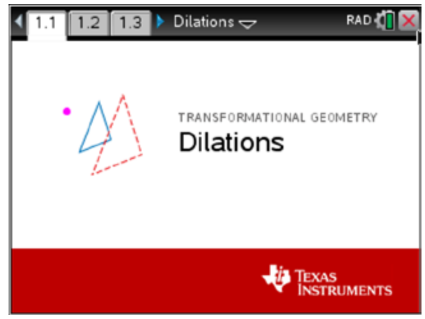
Dilations Lesson 3: Corresponding Sides

Name ______________

Student Activity

Class ______________



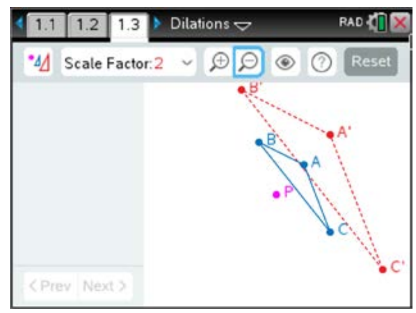
In this lesson, you will investigate the relationship between the pairs of corresponding sides (segments) of dilated triangles.
Open the document: *Dilations.tns*.

PLAY INVESTIGATE EXPLORE DISCOVER

<u>It is important that the Dilations Tour be done before any Dilations lessons.</u>

Move to page 1.3.

On the handheld, press ctrl ▶ and ctrl ◀ to navigate through the pages of the lesson.
On the iPad®, select the page thumbnail in the page sorter panel.



1. Dilate ΔABC about point P with a Scale Factor of 2 (or D). Zoom in (+) or out (−) as needed.
   Observe the corresponding segments: $\overline{AB}$ and $\overline{A'B'}$, $\overline{BC}$ and $\overline{B'C'}$, $\overline{AC}$ and $\overline{A'C'}$.
   Visually, what looks to be true about each pair of segments (**not their lengths**)? Record your observations in the Original row in the table below.

2. a. Investigate the corresponding segments by grabbing and moving each of the three vertices of ΔABC to create different shaped triangles. Record your observations in the table below.

   b. Move point P and record your observations.

   Complete the table.

Scale Factor = 2	$\overline{AB}$ and $\overline{A'B'}$	$\overline{BC}$ and $\overline{B'C'}$	$\overline{AC}$ and $\overline{A'C'}$
Original			
Figure 1			
Figure 2			
Figure 3			

   d. Drag A or B until $\overline{AB}$ is horizontal ↔. What appears to be true about $\overline{A'B'}$?

   e. Drag B or C until $\overline{BC}$ is vertical ↕ . What appears to be true about $\overline{B'C'}$?

3. Make a **conjecture** about the corresponding sides (segments) of a triangle and its image under a dilation about a point. (A ***conjecture*** is an opinion or conclusion based upon what is observed.)

4. Reset the page (Reset or ctrl del). In a similar manner, investigate using a different scale factor. If working with a partner or in a group, each person should choose a different scale factor. If working on your own, use a scale factor of 1/2. To change the scale factor, press Scale Factor: 2 (×) and select the scale factor, then press or enter.

   Dilate ΔABC with the scale factor chosen (or D).

   Zoom in (+) or out (−) as needed. Observe the corresponding segments: $\overline{AB}$ *and* $\overline{A'B'}$, $\overline{BC}$ *and* $\overline{B'C'}$, $\overline{AC}$ *and* $\overline{A'C'}$.

   a. What seems to be true about each pair of these segments (**not their lengths**)?

   b. Investigate by grabbing and moving each of the three vertices of ΔABC to create different shaped triangles. Move point P.

   c. Does your previous conjecture still apply? Compare your results to those of your classmates who used different scale factors.

5. Does the conjecture always work? If not, list a counter example. In groups, determine some ways to prove the conjecture. List them here.

6. Press menu to open the menu on the handheld. (On the iPad, tap on the wrench icon to open the menu.) Press 1 (1: Templates), then 3 (3: Slopes).

   Dilate ΔABC about point P with a Scale Factor of 2 (or D). Zoom in (+) or out (−) as needed. Look at the slopes of the corresponding segments and record the results in the table on the next page in the Original row.

   a. Investigate the slopes of corresponding segments by grabbing and moving each of the three vertices of ΔABC to create different shaped triangles. Record the slopes of corresponding sides of each triangle in the table.

   b. Move point P and record the slopes in the table.

Note: m($\overline{AB}$) means 'the slope of segment AB'.

Scale Factor = 2	m($\overline{AB}$)	m($\overline{BC}$)	m($\overline{AC}$)	m($\overline{A'B'}$)	m($\overline{B'C'}$)	m($\overline{A'C'}$)
Original						
Figure 1						
Figure 2						
Figure 3						

What is the relationship between slope and parallel segments?

7. Reset the page (Reset or ctrl del). Repeat the investigation with a different scale factor than 2.
   If working with a partner or in a group, each person should choose a different scale factor.
   If working on your own, use a scale factor of 1/2.

   To change the scale factor, press Scale Factor: 2 (×) and select the scale factor, then press or enter. Dilate ΔABC with the scale factor chosen (or D).

   Zoom in (+) or out (−) as needed. Create different triangles as before by grabbing and moving vertices and point P. Record the slopes for three different figures.

   Record the scale factor here: **Scale Factor =** ______ and the slopes in the table below.

	m($\overline{AB}$)	m($\overline{BC}$)	m($\overline{AC}$)	m($\overline{A'B'}$)	m($\overline{B'C'}$)	m($\overline{A'C'}$)
Figure 1						
Figure 2						
Figure 3						

   Do your previous conjectures still apply? Compare your results to those of your classmates who used different scale factors.

8. State the conjecture concerning corresponding sides of dilated triangles. Be sure to include all cases. Explain the conjecture.

9. Suppose that ΔDEF were dilated about point P with a scale factor of 5.

   a. If the slope of $\overline{DE} = \dfrac{2}{3}$, then the slope of $\overline{D'E'} =$ _________ .

   b. If the slope of $\overline{EF} = -1$, then the slope of $\overline{E'F'} =$ _________ .

   c. If the slope of $\overline{DF} = 0$, then what two segments could be horizontal? ________________

   d. If $\overline{DE}$ is vertical, then the slope of $\overline{D'E'}$ ______________ .

