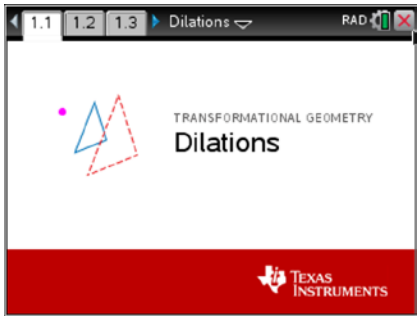
Dilations Lesson 4: P to Vertices Distance

Student Activity

Name _____

Class _____

In this lesson, you will investigate the distances from the point of dilation to each of the vertices of dilated triangles.
Open the document: *Dilations.tns.*



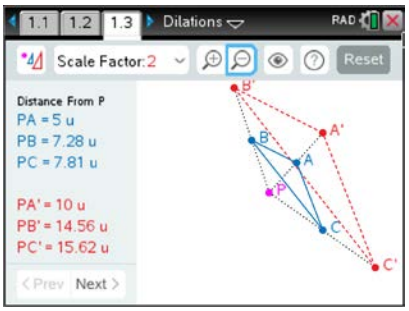
PLAY INVESTIGATE EXPLORE DISCOVER

It is important that the Dilations Tour be done before any Dilations lessons.

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. 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 4 (4: Dist P to Vertices).
   Dilate ΔABC about point P with a Scale Factor of 2 (or D). Zoom in (+) or out (−) as needed.
   Observe the distances from the point of dilation, P, to each vertex. Record the *Original* distances (*first distances displayed*) in the first row of the table below.



2. a. Investigate the distances from P to the vertices by grabbing and moving each of the three vertices of ΔABC to create different shaped triangles.
   Try to make at least one of the distances a whole number. Record the data in the table below.
   b. Move point P and record the distances in the table.
   Record the distances in the table below:

Scale Factor = 2	P to A	P to B	P to C	P to A'	P to B'	P to C'
Original						
Figure 1						
Figure 2						
Figure 3						

3. Make a **conjecture** about the distances from P to the vertices 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).
   Repeat the investigation 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. Create different triangles as before by grabbing and moving vertices and point P. Record the scale factor here: **Scale Factor =** _____and the distances in the table below.

	P to A	P to B	P to C	P to A'	P to B'	P to C'
Figure 1						
Figure 2						
Figure 3						

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

5. Make a conjecture about the distances between point P and each vertex of a triangle and its image under a dilation about a point.

6. Reset the page (Reset or [ctrl] [del]). Change the Scale Factor to 3.

To change the scale factor, press Scale Factor: 2 ([×]) and select Scale Factor 3, then press [▶] or [enter].

Dilate ΔABC with the scale factor chosen (or [D]). Zoom in ([+]) or out ([−]) as needed. Advance to the 'ratios' data by pressing Next ([)]) (right parenthesis key).

Observe the distances in red and blue and look at the ratios. Record the *Original* ratios of the distances (*first ratios displayed*) in the first row of the table below.

a. Investigate the ratios of the distances by grabbing and moving each of the three vertices of ΔABC to create different shaped triangles. Record the ratios in the table.

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

Complete the table.

Scale Factor = 3	PA' : PA	PB' : PB	PC' : PC
Original			
Figure 1			
Figure 2			
Figure 3			

7. Based upon the data in the previous table, what conclusion can be made about the ratio of the distance of point P to each vertex of the image triangle to the distance of point P to each corresponding vertex of the pre-image triangle?

8. Reset the page (Reset or ctrl del).
   Repeat the investigation using a different scale factor than 3. If working 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. Advance to the 'ratios' data by pressing Next ( )) (right parenthesis key).
   Create different triangles as before by grabbing and moving vertices and point P.
   Record the ratios for three different figures.

   Record the scale factor here: **Scale Factor =** _____ and the ratios in the table below.

Scale Factor =	PA' : PA	PB' : PB	PC' : PC
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.

9. Suppose that ΔDEF were dilated about point P with a scale factor of 5.
   a. If PD = 10, then PD' = _____ and DD' = _____.
   b. If PE = 15, then PE' = _____ and EE' = _____.
   c. If PF' = 20, then PF = _____ and FF' = _____.

10. Suppose that ΔDEF were dilated about point P with a scale factor of $\frac{1}{3}$.
   a. If PD = 12, then PD' = _____ and DD' = _____.
   b. If PE = 15, then PE' = _____ and EE' = _____.
   c. If PF' = 21, then PF = _____ and FF' = _____.