



Reflections Lesson 1: Connected Segments Name _____

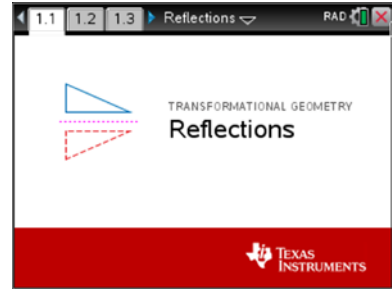
Student Activity   

Class _____


In this lesson, you will investigate the segments that connect corresponding vertices of triangles that have been reflected about a line and discover how to reflect a triangle about a line by hand.



Open the document: *Reflections.tns*.


It is important the Reflections Tour be done before any Reflections lessons.




PLAY INVESTIGATE EXPLORE DISCOVER

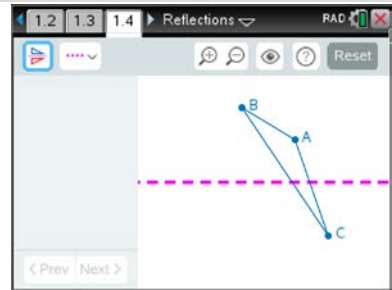
Move to page 1.4. ( ► three times)

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



1. Press  to open the menu.

(On the iPad®, tap on the wrench icon  to open the menu.)

Press  (1: Templates),  (1: Connected Segments).



2. Reflect $\triangle ABC$ about the **horizontal line**. (click on  or press **R**).

Zoom   in (**+**) or out (**-**) as needed.

a. Look at the black dotted segments: $\overline{AA'}$, $\overline{BB'}$, $\overline{CC'}$. They connect corresponding vertices.

b. Grab and move one or more of the vertices (**A**, **B**, **C**) of $\triangle ABC$ until the image and pre-image are on opposite sides of the line of reflection. Make conjectures.

A **conjecture** is an opinion or conclusion based upon what is observed.

Discuss in your group about the relationship between the black dotted segments and the pink dashed line of reflection (\overline{ST}).

What seems to be true about $\overline{AA'}$ and \overline{ST} ? _____

What seems to be true about $\overline{BB'}$ and \overline{ST} ? _____

What seems to be true about $\overline{CC'}$ and \overline{ST} ? _____


Discuss in your group about what seems to be true about the **lengths** of the segments:

SA and SA' ? _____ TB and TB' ? _____ UC and UC' ? _____





In a group of four, one pair of students does #3, the other pair, #4. Compare results.

3. Reset the page. Press  ( ).

Change the line of reflection to a **vertical line** ().

(On the iPad®, tap the Reflection Line dropdown menu icon and select the line of reflection.)

Reflect $\triangle ABC$ about the vertical line. (click on  or press ).

- a. Look at the black dotted segments: $\overline{AA'}$, $\overline{BB'}$, $\overline{CC'}$. They connect corresponding vertices.

- b. Grab and move one or more of the vertices of $\triangle ABC$ until the image and pre-image are on opposite sides of the line of reflection.

Discuss in your group about the relationship between the black dotted segments and the pink dashed line of reflection (\overline{ST}).

What seems to be true about $\overline{AA'}$ and \overline{ST} ? _____

What seems to be true about $\overline{BB'}$ and \overline{ST} ? _____



What seems to be true about $\overline{CC'}$ and \overline{ST} ? _____

Discuss in your group about what seems to be true about the **lengths** of the segments:

SA and SA' ? _____ TB and TB' ? _____ UC and UC' ? _____

4. Reset the page. Press  ( ).

Change the line of reflection to a **slanted line** ().

Reflect $\triangle ABC$ about the slanted line. (click on  or press ).

- a. Look at the black dotted segments: $\overline{AA'}$, $\overline{BB'}$, $\overline{CC'}$. They connect corresponding vertices.

- b. Grab and move one or more of the vertices of $\triangle ABC$ until the image and pre-image are on opposite sides of the line of reflection.

Discuss in your group about the relationship between the black dotted segments and the pink dashed line of reflection (\overline{ST}).

What seems to be true about $\overline{AA'}$ and \overline{ST} ? _____

What seems to be true about $\overline{BB'}$ and \overline{ST} ? _____

What seems to be true about $\overline{CC'}$ and \overline{ST} ? _____

Discuss in your group about what seems to be true about the **lengths** of the segments:

SA and SA' ? _____ TB and TB' ? _____ UC and UC' ? _____



5. Confirm or disprove your conjectures by doing the following:
- Press **[menu]** , **[1]** for Templates and **[2]** for Dist to Reflection Line.
Reflect (**[R]**) $\triangle ABC$ about the **horizontal line**.

Record the lengths in the table below in the row marked 'Horizontal'.

	SA	TB	UC	SA'	TB'	UC'
Horizontal						
Vertical						
Slanted						

- Change the line of reflection to a **vertical line** (**[I]**). Grab and move all three vertices and the shape. Record the lengths in the previous table in the row marked 'Vertical'.

Change the line of reflection to a **slanted line** (**[J]**). Grab and move all three vertices and the shape. Record the lengths in the previous table in the row marked 'Slanted'.

Based on all the values in the table, fill in the blanks so that each statement is **always** true:

SA = _____ TB = _____ UC = _____

Discuss in your groups and make a general statement that appears to be true.

- To see the next set of data, click on **Next >** or press **[J]** , the right parenthesis key.

Look at the measures of the six angles displayed.

What is the measure of each of the angles? _____^o .

(NOTE: ignore the angle measures that are listed as 'und', which means undefined.)

Change the line of reflection to a **horizontal line** (**[H]**).

Grab and move each of the three vertices, notice the angle measures, they are each _____^o .

Change the line of reflection to a **vertical line** (**[I]**). Grab and move the vertices. Look at the angle measures, they are each _____^o .

Change the line of reflection to a **slanted line** (**[J]**). Grab and move the vertices. Look at the angle measures. Discuss in your groups what type of angles these angles are.

What types of lines do right angles form? _____

Based on the angle measures, what one word describes these lines (besides intersecting):

Line AA' and the line of reflection, \overline{ST} ? _____



Line BB' and the line of reflection, \overline{ST} ? _____

Line CC' and the line of reflection, \overline{ST} ? _____

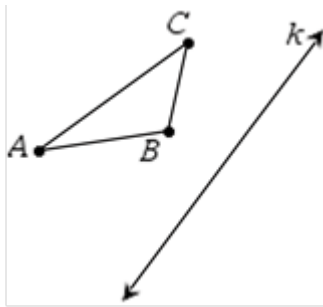
What **one word** describes the relationship among all three connected segments $\overline{AA'}$, $\overline{BB'}$, and $\overline{CC'}$? _____

6. Use a straightedge to make a sketch of $\triangle ABC$ being reflected about a line, k .

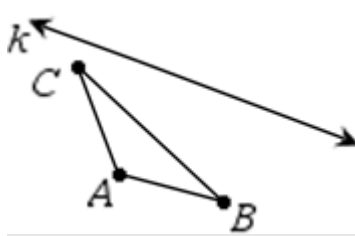
Draw in the dotted connected segments, $\overline{AA'}$, $\overline{BB'}$, and $\overline{CC'}$. Label the points of intersection on line k : S on $\overline{AA'}$, T on $\overline{BB'}$, and U on $\overline{CC'}$. Use this sketch to answer the questions below.

(Note: each student does the first one, i, as a class. Then each pair of students does either ii or iii.)

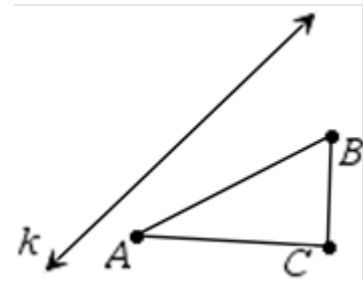
i)



ii)



iii)



a. If $AS = 6$ cm, $SA' =$ _____ and $AA' =$ _____.

b. If $CC' = 8$ in, $UC =$ _____ and $UC' =$ _____.

c. If $BT = 3.2$ cm, $BB' =$ _____.

d. Fill in the blanks with an appropriate symbol: \parallel 'is parallel to' or \perp 'is perpendicular to'

$\overline{AA'}$ _____ k

$\overline{AA'}$ _____ $\overline{CC'}$

$\overline{BB'}$ _____ $\overline{CC'}$

$\overline{CC'}$ _____ k

e. $m\angle AST =$ _____ $^\circ$

f. Points A and A' are the same _____ from line k ;

points B and B' are the same _____ from line k ;

and points C and C' are the same _____ from line k .