Translations: Lesson 1 Angles & Sides

Student Activity

Name _____

Class _____

In this lesson, you will investigate the measures of angles and lengths of sides of triangles that have been translated in different ways. Open the document: *Translations.tns.*

It is important that one of the Translations Tours be done before any Translations lessons.

PLAY INVESTIGATE EXPLORE DISCOVER

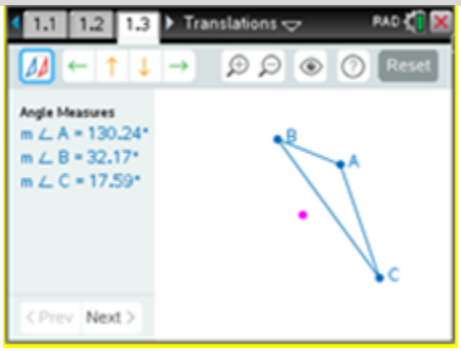
Move to page 1.3. (ctrl ▶ two times)

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

   Press 1 (1: Templates), 1 (1: Angles & Sides).



2. To translate ΔABC up 2 units and to the left 3 units, click on or press T, then press the up arrow (▲) twice and the left arrow (◀) three times.

   Zoom in (+) or out (−) as needed.

   a. Record the Original angle measures (first measures displayed) in the first row of the following table.

   b. Investigate and mentally make note of Angle Measures by grabbing and moving each of the three vertices of ΔABC (A, B, C) to create different shaped triangles.
   Record a set of data observed in row "Figure 1" in the following table.

Up 2, Left 3	$m\angle A$	$m\angle B$	$m\angle C$	$m\angle A'$	$m\angle B'$	$m\angle C'$
Original						
Figure 1						

   c. Discuss observations in your group. Write a conjecture about the angle measures.

d. Click on Next > or press [ )] to see the lengths of the sides of the triangles.
Record the Original side lengths (first measures displayed) in the first row of the following table.

e. Investigate and mentally make note of Side Lengths by grabbing and moving each of the three vertices of ΔABC ([A], [B], [C]) to create different shaped triangles.
Record a set of data observed in row "Figure 1" in the following table.

Up 2, Left 3	$\overline{AB}$	$\overline{BC}$	$\overline{CA}$	$\overline{A'B'}$	$\overline{B'C'}$	$\overline{C'A'}$
Original						
Figure 1						

f. Discuss observations in your group. Write a conjecture about the lengths of the sides.

3. Reset the page. Press Reset ([ctrl] [del]).
Repeat what was done in exercise 2, but with each person in the group doing a different translation. Each person in the group should choose one from the following:

i) Translate ΔABC down 4 units and to the right 2 units.
ii) Translate ΔABC up 5 units.
iii) Translate ΔABC down 1 unit and to the left 4 units.
iv) Translate ΔABC up 6 units and to the left 3 units.

a. Record the Original angle measures (first measures displayed) in the first row of the table below.

b. Investigate and mentally make note of Angle Measures by grabbing and moving each of the three vertices of ΔABC ([A], [B], [C]) to create different shaped triangles.
Record a set of data observed in row "Figure 1" in the following table.

Circle: i ii iii iv	$m\angle A$	$m\angle B$	$m\angle C$	$m\angle A'$	$m\angle B'$	$m\angle C'$
Original						
Figure 1						

c. Discuss observations in your group. Is your conjecture about the angle measures still true?

d. Click on Next > or press) to see the lengths of the sides of the triangles.
Record the Original side lengths (first measures displayed) in the first row of the table below.

e. Investigate and mentally make note of Side Lengths by grabbing and moving each of the three vertices of ΔABC (A, B, C) to create different shaped triangles.
Record a set of data observed in row "Figure 1" in the following table.

Circle: i ii iii iv	$\overline{AB}$	$\overline{BC}$	$\overline{CA}$	$\overline{A'B'}$	$\overline{B'C'}$	$\overline{C'A'}$
Original						
Figure 1						

f. Discuss observations in your group. Is your conjecture about the lengths of the sides still true?

4. Many different triangles have been translated in several directions.
Generalize explorations and investigations by responding to the following:
   a. If a triangle is translated, what appears to be true about the measures of the angles of the pre-image and image triangles?

   b. If a triangle is translated, what appears to be true about the lengths of the sides of the pre-image and image triangles?

5. Because the corresponding angles and the corresponding sides of the pre-image and image triangles are congruent, the triangles are congruent.
Therefore, a translation is a **rigid motion**, or an **isometry**.
We also say that a translation is a **distance-preserving** and an **angle-preserving** transformation.

6. ΔDEF has been translated down 7 units and to the right 8 units. Answer the following.

   a. If $m\angle D = 35^o$, $m\angle D' =$ _____.

   b. If EF = 8 cm, E'F' = _____.

   c. If $m\angle E = 120^o$, which other angle has a measure of 120^o? _____

   d. If DF = 3 in, which other segment has a length of 3 in? _____