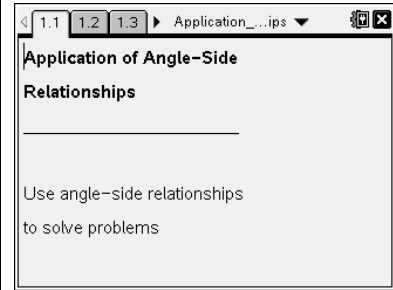


Triangles can be used to solve real-world problems. Using the six parts of a triangle, three angles and three sides, and properties of triangles can be helpful when solving problems involving triangles.



- **Open the TI-Nspire document *Application\_of\_Angle-Side\_Relationships*.**
- **Press  $\text{ctrl}$   $\blacktriangleright$  to move to page 1.2 and begin the activity.**

Roof trusses are triangular structures found in houses and other buildings. Suppose  $\triangle ABC$  on page 1.2 is a roof truss, where segment  $AC$  is the horizontal piece that attaches to the walls and vertex  $B$  is the peak of the roof.

Suppose you work for a construction company that is building a one-room addition. The pieces for the roof trusses are delivered, but the blueprint has been smeared and is unreadable. On page 1.4, there are three segments that represent the three pieces of wood needed to make a roof truss.

- **Move to page 1.4.**

1. What do you know about the angles of the roof truss based only on the lengths of the wood? Could you determine which is the smallest and the largest? Explain.

---

---

2. Create a triangular roof truss by dragging the segments and using the endpoints to rotate the segments. Once the roof truss is complete, label the vertices using the **Text** tool (**MENU > Actions > Text**). Use capital letters that are the same letter as the side length opposite the angle. Draw a sketch of the roof truss below. Label the points and measurements.

3. Find the measures of each angle using the **Angle** tool (**MENU > Measurement > Angle**). Select the tool, and then click on the three points of the angle to be measured, with the second point being the vertex of the angle. Write the angle measures below.

---

4. Now that you know the angle measures, how does it compare to what you listed in Question 1?

\_\_\_\_\_

➤ **Move to page 2.1.**

The building contractor calls and informs you that the clients have made a change to the building plans. A 7-foot piece of wood is to be used for the roof truss instead of the 10.5-foot piece of wood. On page 2.3, cut the 10.5-foot piece of wood to change the measurement to 7 feet. To do this, drag the endpoint of the 10.5 foot piece until the measurement reads 7 feet. To lock the length, select the **Attributes** tool (**MENU > Actions > Attributes**); move down to the lock picture; press the right arrow, changing the open lock to a closed lock; and press **(enter)**.

5. Explain how this change will affect the angle measures of the triangle. Which angle measure(s) will change? Why?

\_\_\_\_\_  
\_\_\_\_\_

➤ **Move to page 2.3.**

6. Drag and rotate the pieces of wood to form a triangular roof truss. Label the vertices with the **Text** tool, using the same method as in Question 2. Draw a sketch of the roof truss below. Label the points and measurements.

7. Measure the angles. How does the triangle compare to your predictions in Question 5?

\_\_\_\_\_

8. Could you build the roof truss without knowing the angle measures? Explain your reasoning.

\_\_\_\_\_  
\_\_\_\_\_