Application of Angle-Side Relationships

TIMATH.COM: GEOMETRY

TEACHER NOTES

Math Objectives

- Students will recognize the relationship between the measures of the sides and opposite angles in a triangle—specifically that the largest angle in a triangle is opposite the largest side and the smallest angle is opposite the smallest side.
- Students will see examples of how triangles can be used to solve real-world problems.

Vocabulary

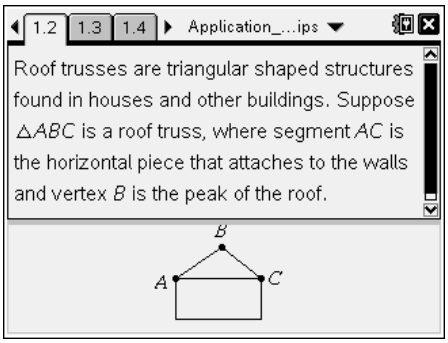
- opposite side
- opposite angle

About the Lesson

- This lesson is a follow-up lesson to the activity *Angle-Side Relationships in Triangles*.
- This lesson involves students building triangles used to represent roof trusses in order to explore the relationship between the measures of the sides and opposite angles of triangles.

Related Lessons

- Prior to this lesson: Angle-Side Relationships in Triangles
- After this lesson: Pythagorean Relationships



TI-Nspire™ Technology Skills:

- Download TI-Nspire document
- Open a document
- Move between pages
- Grab, drag, and rotate a segment
- Change the length of a segment
- Lock the length of a segment
- Measure an angle
- Label a point

Tech Tips:

- *Make sure the **font size** on your TI-Nspire handhelds is set to Medium.*

Lesson Materials:

Student Activity

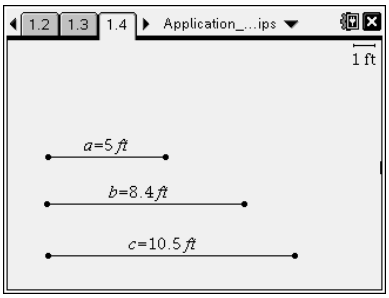
Application_of_Angle-Side_Relationships_Student.pdf

Application_of_Angle-Side_Relationships_Student.doc

TI-Nspire document

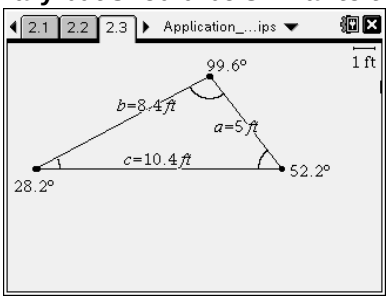
Application_of_Angle-Side_Relationships.tns

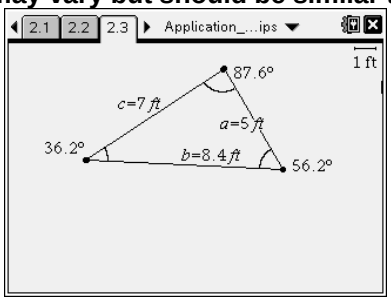
Discussion Points and Possible Answers:



TI-Nspire Problem/Pages 1.3 and 2.3

Tech Tip: *If students experience difficulty dragging a point or segment, check to make sure that they have moved the cursor (arrow) until it becomes a hand (☜) getting ready to grab the object. Also, be sure that the word* point *or* segment *appears. Then press* (ctrl) [☜] *to grab the object and close the hand (✊). When finished moving the object, press* (esc) *to release.*

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.	**The size of each angle will be directly related to the length of the side opposite the angle. The smallest angle will be opposite the smallest side, 5 ft. The largest angle will be opposite the largest side, 10.5 ft.** ***Teacher Tip:*** *Students might need a review of opposite sides of angles and vice versa. Specifically, reminding students that AC is considered the side opposite angle B may be helpful.*
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.	**Sketches may vary but should be similar to the one below.**  ***Teacher Tip:*** *Students should place the vertex label next to the vertex rather than selecting a point.*
3. Find the measures of each angle using the **Angle** tool (**MENU > Measurement > Angle**). Now click on the three points of the angle you are measuring, with the second point being the vertex of the angle. Write the angle measures below.	**The angle measures may vary slightly but should be similar to the angle measures in the sketch above.** ***Teacher Tip:*** *When students find the angle measures, it may occur that the angle measurements that appear do not add up to exactly 180°. In this case, students can use the* ***Attributes*** *tool to change the number of decimal places to get a more exact degree measure. Students can then round the degree measure themselves.*

4. Now that you know the angle measures, how does it compare to what you listed in Question 1?	**Answers may vary and are dependent on the answer to Question 1.**
5. Explain how this change will affect the angle measures of the triangle. Which angle measure(s) will change? Why?	**Changing the length of one side will create a new triangle and will affect all the angle measures. Angle *C* will no longer be the largest angle since it is no longer opposite the longest side. The longest side will now be the 8.4 ft piece, so the largest angle will be angle *B*.**
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.	**Sketches may vary but should be similar to the one below.** 
7. Measure the angles. How did the triangle compare to your predictions in Question 5?	**The angle measures may vary slightly but should be similar to the angle measures in the sketch above.**
8. Could you build the roof truss without knowing the angle measures? Explain your reasoning.	**Yes, the largest angle is opposite the largest side, etc., so there is only one way for a triangle to be formed with the specific lengths given. You do not need the angle measures to know how to form the roof truss.**

Wrap Up:

Upon completion of the discussion, the teacher should ensure that students are able to:

- Understand how triangles can be used in real-world problems.
- Understand the largest angle is opposite the largest side, the next largest angle is opposite the next largest side, and the smallest angle is opposite the smallest side in a triangle.