TI-*nspire*™

Grade level: 9-12
Subject: Trigonometry
Time required: 45 minutes

Law of Sines

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Activity overview

Students will investigate all the cases in which the Law of Sines can be used to solve a triangle. An animation is provided in the lesson which will help students to gain a better understanding of the ambiguous case SSA.

Concepts

- Solving a right triangle using trigonometry
- Solving an oblique triangle using the Law of Sines

Teacher preparation

Students should recognize equal ratios and use them to solve a proportion.
Students should know what is meant by AAS, ASA, SSA.

The screenshots on pages 2-4 demonstrate expected student results. Refer to the screenshots on page 5-6 for a preview of the student .tns file.

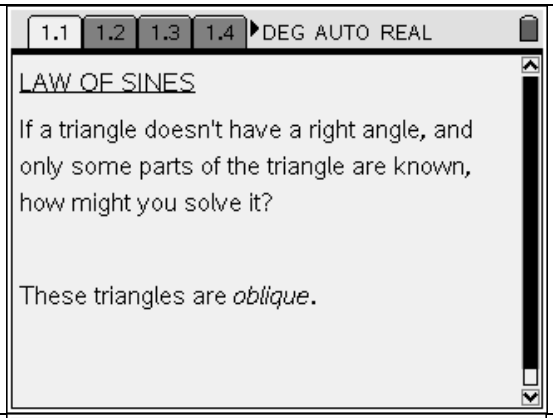
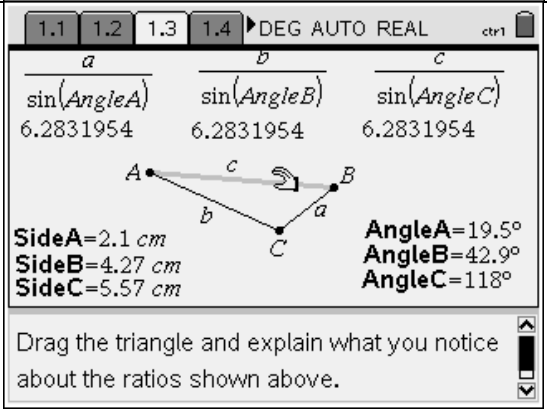
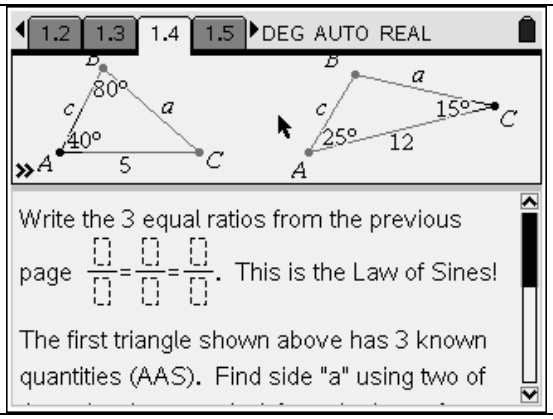
Classroom management tips

This activity is designed to be student-centered with the teacher acting as a facilitator while students work cooperatively. The student worksheet is provided for students to record their answers to the questions asked in the activity. Students will be required to do calculations either on a separate calculator or by inserting a new calculator page into the provided file.

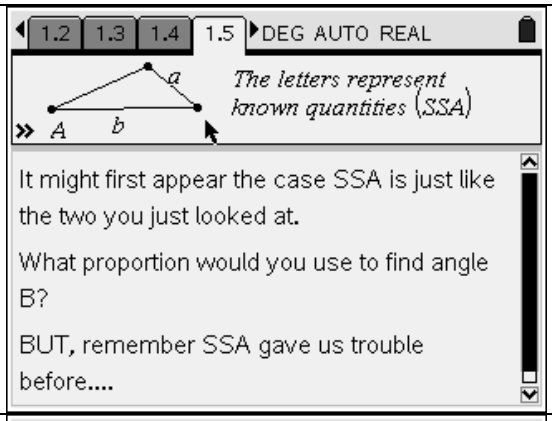
You may choose to do the last "Summarize" page as a whole-class discussion.

TI-Nspire Applications

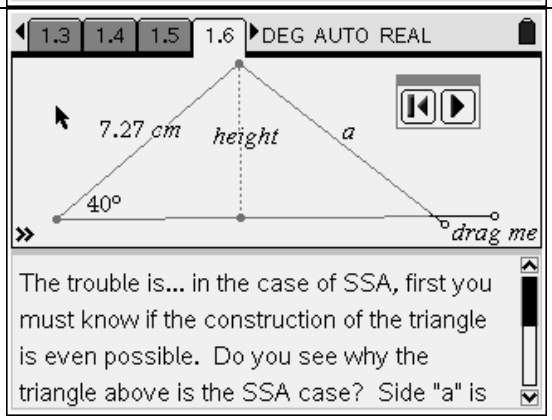
Graphs & Geometry, Notes, Calculator

Discuss with students how to solve a triangle that *does contain a right angle.* The key to using the sine, cosine, and tangent ratios when finding parts of a triangle was the right angle.	
Encourage students to drag all vertices of the triangle and observe the results.	
Students may need to toggle ctrl tab to the Notes portion of this screen so that the entire note is visible. Remind students why these two cases are identified as AAS and ASA.	

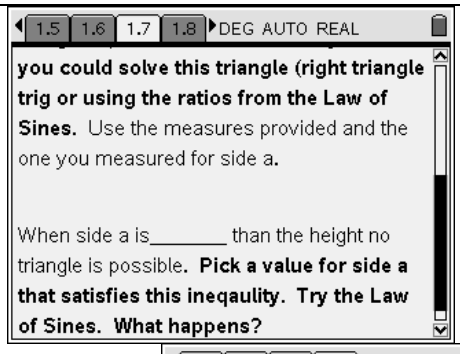
When students begin to solve the case AAS they will begin with $\frac{a}{\sin A} = \frac{b}{\sin B}$. To use the ratio $\frac{c}{\sin C}$, they need to be reminded that $\angle A, \angle B, \text{ and } \angle C$ are supplementary.

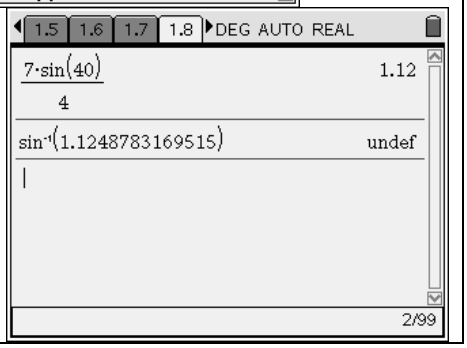


The endpoint of segment *a* can also be grabbed and moved to a new location independent from the animation button. Student may need to do this to make the triangle as exactly as possible.

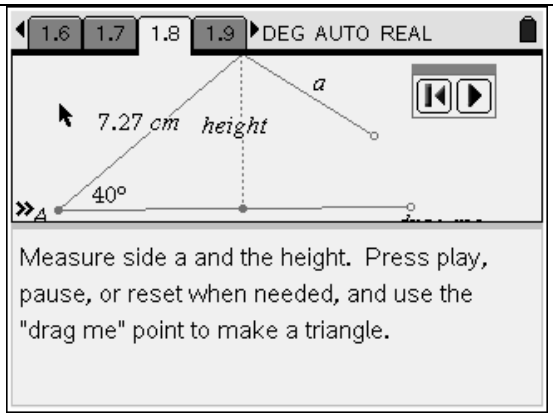
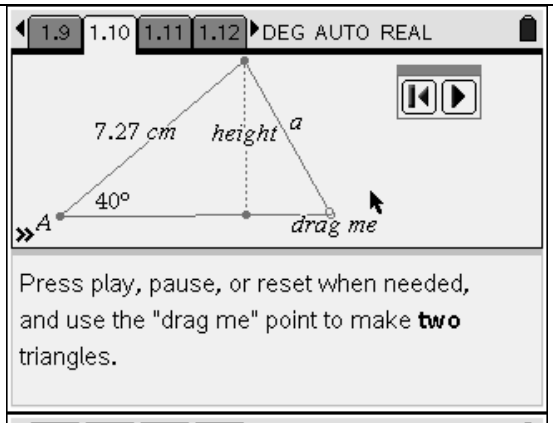
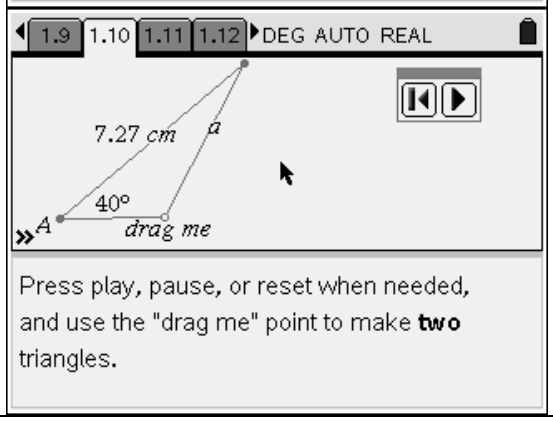


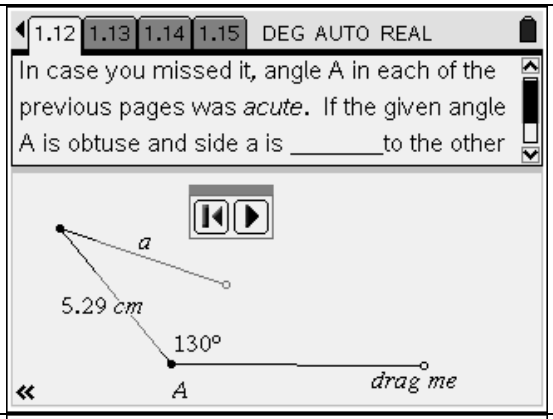
Students should show on the student worksheet that the calculator gives an undef answer if side a is less than the height of the triangle.





Note: This page was added to the file temporarily to show what happens in this case, it is not part of the student file.

Encourage students to sketch the resulting triangle on their student worksheet.	
Students should allow the animation to play all the way through to see both triangles. The height disappears when the second triangle is made so students need to measure it from the first triangle.	 

Last, an exploration of the obtuse case.	
End with some practice to apply what was learned!