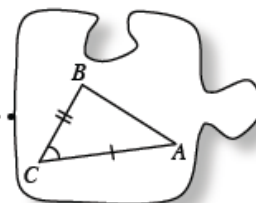


## 5.3.5 Which tool should I use?

### Choosing a Tool

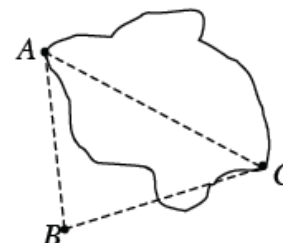


During this section, you have developed new tools such as the Law of Sines and the Law of Cosines to find the lengths of sides and the measures of angles of a triangle. These strategies are very useful because they work with all triangles, not just right triangles. But when is each **strategy** the best one to use? Today you will focus on which **strategy** is most effective to use in different situations. You will also apply your **strategies** to triangles in different contexts.

As you work on these problems, keep in mind that good communication and a joint brainstorming of ideas will greatly enhance your team's ability to **choose a strategy** and to solve these problems.

#### 5-106. LAKE TOFTEE, Part One

A bridge is being designed to connect two towns along the shores of Lake Toftee in Minnesota (one at point A and the other at point C). Lavanne has been given the responsibility of determining the length of the bridge.

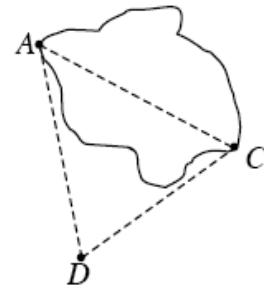


Since he could not accurately measure across the lake ( $AC$ ), he measured the only distance he could by foot ( $AB$ ). He drove a stake into the ground at point B and found that  $AB = 684$  feet. He also used a protractor to determine that  $m\angle B = 79^\circ$  and  $m\angle C = 53^\circ$ . How long will the bridge need to be?

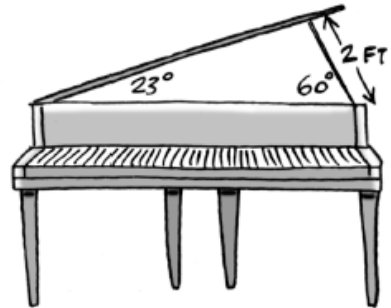
## 5-107. LAKE TOFTEE, Part Two

Lavanne was not convinced that his measurements from problem 5-106 were correct. He decided to measure the distance between towns A and C again using a different method to verify his results.

This time, he decided to drive a stake in the ground at point D, which is 800 feet from town A and 694 feet from town C. He also determined that  $m\angle D = 68^\circ$ . Using these measurements, how wide is the lake between points A and C? Does this confirm the results from problem 5-106?

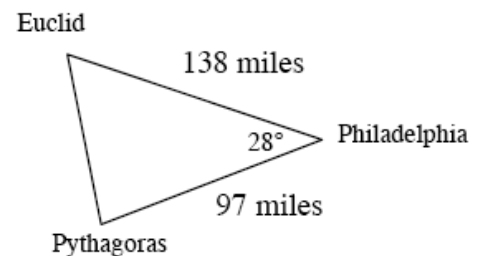


- 5-108. The lid of a grand piano is propped open by a supporting arm, as shown in the diagram at right. Carson knows that the supporting arm is 2 feet long and makes a  $60^\circ$  angle with the piano. He also knows that the piano lid makes a  $23^\circ$  angle with the piano. How wide is the piano?



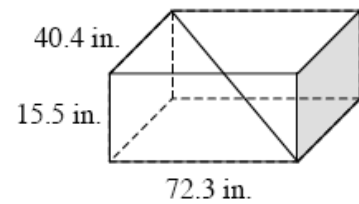
## 5-109. PENNANT RACE

Your basketball team has made it to the semi-finals and now needs to win only two more games to go to the finals. Your plan is to leave Philadelphia, travel 138 miles to the town of Euclid, and then play the team there. Then you will leave Euclid, travel to Pythagoras, and play that team. Finally, you will travel 97 miles to return home.

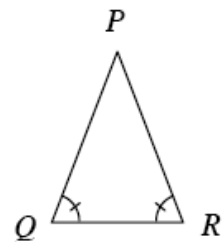


Your team bus can travel only 300 miles on one tank of gas. Assuming that all of the roads connecting the three towns are straight and that the two roads that connect in Philadelphia form a  $28^\circ$  angle, will one tank of gas be enough for the trip? **Justify** your solution.

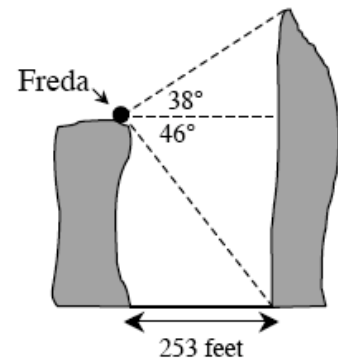
- 5-110. Shonte is buying pipes to install sprinklers for her front lawn. She needs to fit the pipes into the bed of her pickup truck to get them home from the store. She knows that the longest dimension in her truckbed is from the top of one corner to the bottom of the bed at the opposite corner. After measuring the truckbed, she drew the diagram at right. What is the longest pipe she can buy?



- 5-111. In problem 5-105 from homework, you used your intuition to state that if a triangle has two angles that are equal, then the triangle has two sides that are the same length. Now use your triangle tools to show that your intuition was correct. For example, for  $\triangle PQR$ , show that if  $m\angle Q = m\angle R$ , then  $PQ = PR$ .



- 5-112. As Freda gazes at the edge of the Grand Canyon, she decides to try to determine the height of the wall opposite her. Using her trusty clinometer, she determines that the top of the wall is at a  $38^\circ$  angle above her, while the bottom is at a  $46^\circ$  angle below her, as shown in the diagram at right. If the base of the wall is 253 feet from the point on the ground directly below Freda, determine the height of the wall opposite her.



- 5-113. While facing north, Lisa and Aaron decide to hike to their campsite. Lisa plans to hike 5 miles due north to Lake Toftee before she goes to the campsite. Aaron plans to turn  $38^\circ$  east and hike 7.4 miles directly to the campsite. How far will Lisa have to hike from the lake to meet Aaron at the campsite? Start by drawing a diagram of the situation, then calculate the distance.

