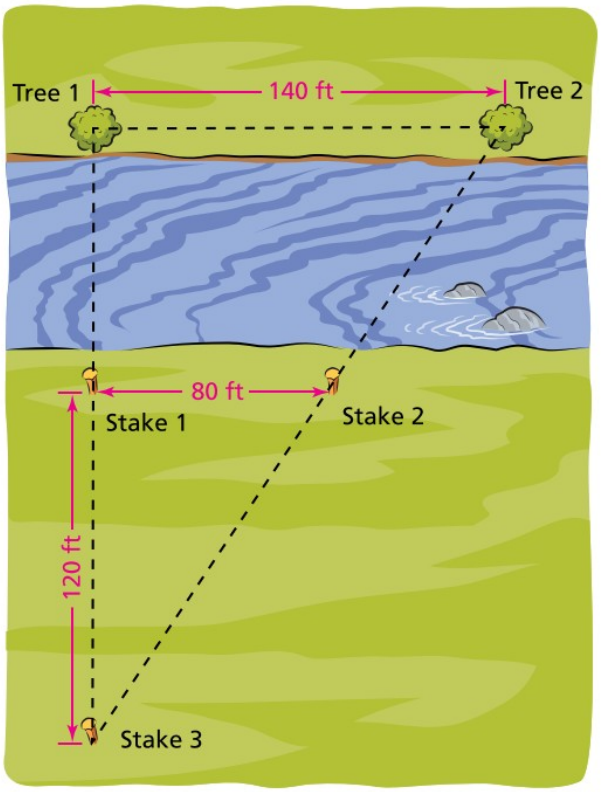
3.4 Out of Reach

Finding Lengths With Similar Triangles

Durell, Angie, and Tonya are designing a triangular boardwalk that crosses a river for a class project. They make several measurements and sketch the diagram below.

The students use similar triangles to find distances that are difficult to measure. The diagram shows a specific type of similar triangles, **nested triangles,** which are triangles that share a common angle.



- The angles that look like right angles are right angles. How are the angles in the smaller triangle related to the angles in the larger triangle?
- Durell claims that he can use rep-tiles to show that the smaller right triangle is similar to the larger right triangle. Is he correct?

Two triangles are similar if corresponding angles are congruent. In a later Unit, you will prove this fact. For now, we will assume that it is true.

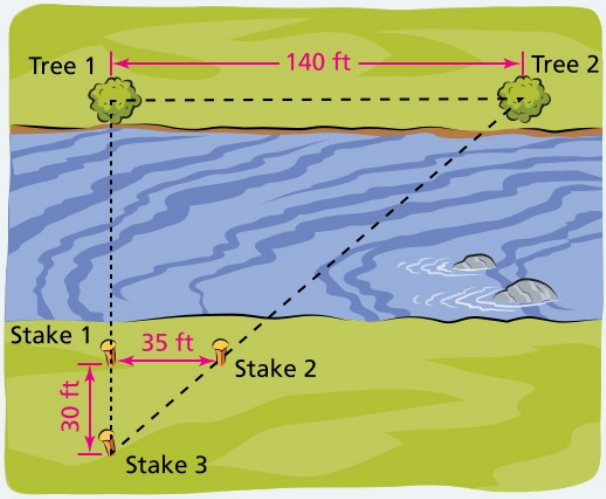
Problem 3.4

A The triangles in the diagram on the previous page are similar. What is the distance across the river from Stake 1 to Tree 1? Explain your reasoning.

B Describe the relationship between the perimeter of the smaller triangle and the perimeter of the larger triangle.

C The diagram on the previous page shows three stakes and two trees. In what order do you think Durell, Angie, and Tonya located the key points and measured the segments and angles? Explain your reasoning.

D Another group of students sketches a different diagram with similar triangles. They put their stakes in different places. Use the diagram below. Does the second group get the same measurement for the width of the river? Explain.



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