WORKSHOP 1·6

Handout

Four problem-solving steps — *understand* the problem, *come up* with a plan, *carry out* the plan, and *reflect* on the answer — were outlined by Pólya in his 1945 book *How to Solve It*. In this workshop, you will work on a problem using these four steps. You are asked to focus particularly on the second step. Pólya listed a number of heuristics, or strategies, helpful in understanding a problem. One of them is to *derive the result in a different way*. Getting the same answer two different ways can give a strong confirmation of a result.

Try to solve the following problem in two different ways, using Pólya's four-step process. Remember that the process here is as important as the answer.

> **Warm-up question:** Find the area of a square whose diagonal is of length 2.

> **Main Problem:** A hiker sets off on a mountain ascent at 7:00 a.m. in the morning. She reaches the summit at 5:00 p.m. The next morning, she begins her descent at 7:00 a.m., taking the same path back. She reaches the bottom of the mountain at 5:00 p.m. Show, in two different ways, that there is a point on the path that the hiker will cross at exactly the same time of day on both days.

Work out this problem at the board. Make sure every member of your group is involved.

When you are confident with your answer, write out your full solution on a fresh piece of the board. This should be a *full* solution, including things like sentences and punctuation. Then call over one of your TAs. You will get full marks if your solution is correct and if you explain it well.