

A Möbius Trisection

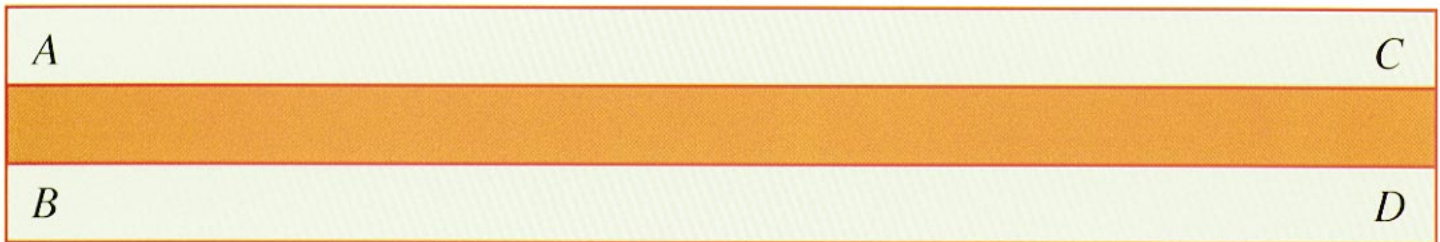
Problem-of-the-Week

The Problem

Use a strip like the one shown. Make the strip at least 2 feet long and color it in three equal parts on both sides.

Now, make a Möbius strip by giving the ends of the strip a half twist. Tape *A* on to *D* and *B* on to *C*.

Trisect the Möbius strip by cutting all the way around, a third of the way in from one edge. Does the result contain two Möbius strips equivalent to the original strip? If not, how is it different?



Strategies and Hints

1. Different Möbius bands are distinguished by the number of half twists in them. Use the number of half twists to describe the results of the Möbius trisection.
2. A Möbius band with an odd number of half twists will become one longer band when bisected. A band with an even number of half twists will become two bands when bisected. Predict what you would get if you bisected the two strips that you got from the Möbius trisection.
3. When you have solved the original problem, try this one. Rearrange the two linked bands that result from a Möbius trisection to form a triple-thick Möbius band. Is this structure equivalent to three of the original Möbius bands? If not, how is it different?