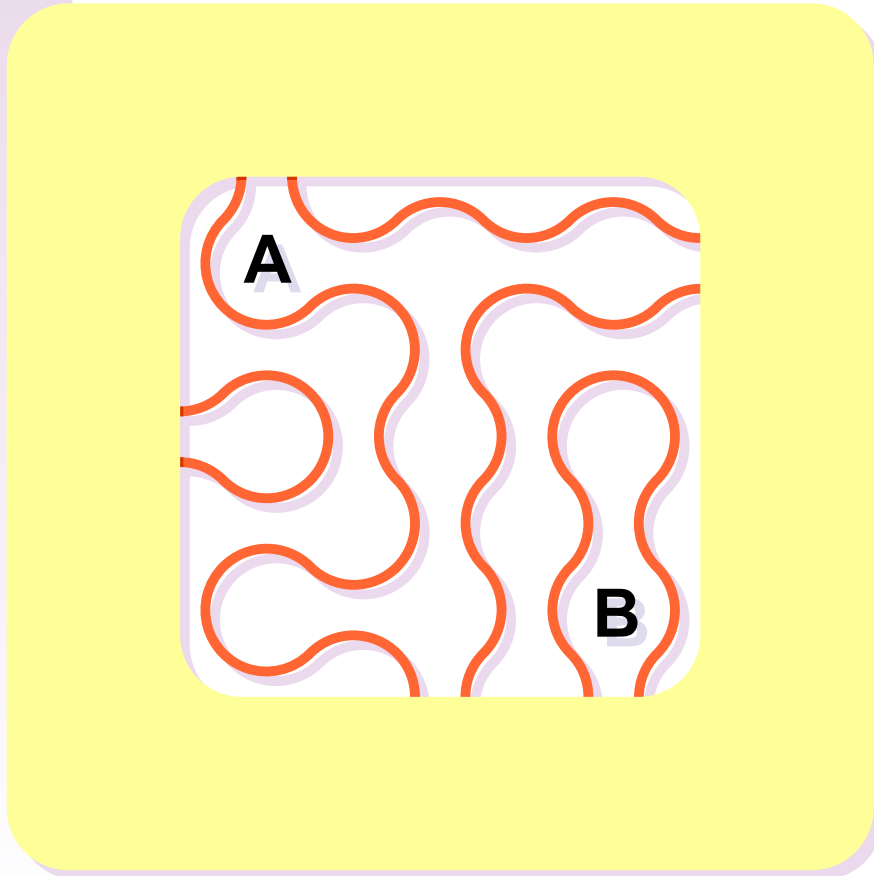


Treasure of Classic
and Modern Puzzles

Math 'n' Logic Puzzles



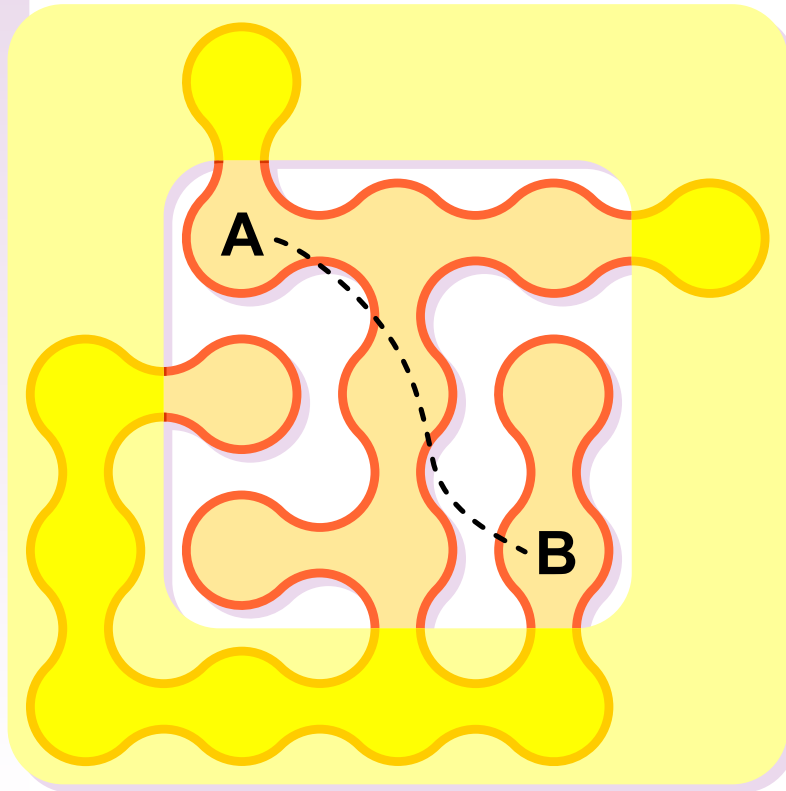
In 'n' Out

after Martin Gardner

A simple closed curve that is very twisty is hidden under a piece of paper with the square hole in it so that a part of the curve is visible - as shown in the illustration. Now if it is told that region A is inside the curve, is region B inside or outside it?

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In 'n' Out (solution)

Region B is inside the curve. This can be said because of an interesting theorem about simple closed curves. All "inside" regions of such a curve are separated from each other by an even number of lines. The same is true of all "outside" regions. And any inside region is separated from any outside region by an odd number of lines. Zero is considered an even number, so if there are no lines between two regions, then of course they will be part of the same "side," and our theorem still holds.

When we pass from any part of region A to any part of region B, along any path, we cross an even number of lines. In the illustration one such path is shown by the dotted line. As it can be seen the line crosses four lines, an even number. So we can say with certainty that no matter what the rest of this curve looks like, region B is also inside.

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