

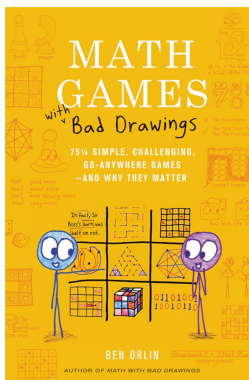
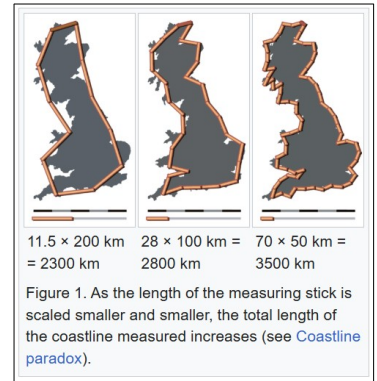
≡ Fractal

Article Talk

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In [mathematics](#), a fractal is a [geometric shape](#) containing detailed structure at arbitrarily small scales, usually having a [fractal dimension](#) strictly exceeding the [topological dimension](#). Many fractals appear similar at various scales, as illustrated in successive magnifications of the [Mandelbrot set](#). This exhibition of similar patterns at increasingly smaller scales is called [self-similarity](#) [...].

One way that fractals are different from finite [geometric figures](#) is how they [scale](#). Doubling the edge lengths of a filled [polygon](#) multiplies its area by four, which is two (the ratio of the new to the old side length) raised to the power of two (the conventional dimension of the filled polygon). [...] However, if a fractal's one-dimensional lengths are all doubled, the spatial content of the fractal scales by a power that is not necessarily an [integer](#) and is in general greater than its conventional dimension. This power is called the [fractal dimension](#) of the geometric object, to distinguish it from the conventional dimension (which is formally called the [topological dimension](#)). A [fractal](#) pattern changes with the [scale](#) at which it is measured.



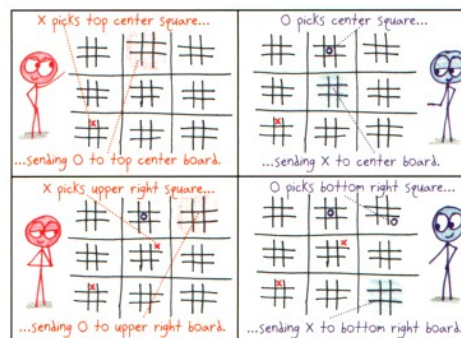
ULTIMATE TIC-TAC-TOE

A GAME OF FRACTAL STRUCTURE

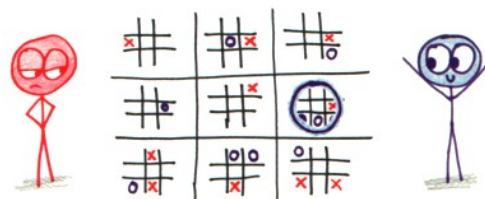
THE RULES

What do you need? Two players, pen, and paper. Draw a large tic-tac-toe board, and then fill each of the nine squares with a smaller tic-tac-toe board.

1. Take turns marking individual squares. The first move of the game can occur anywhere; after that, you must play on the mini-board dictated by your opponent's previous move. How so? **Whichever square they picked, you must play on the corresponding mini-board.**



2. If you place **three in a row on a mini-board**, then you win that mini-board. The board is now closed; any player sent there may move anywhere they like, on any other board.



3. **Three mini-boards in a row wins the game.**

