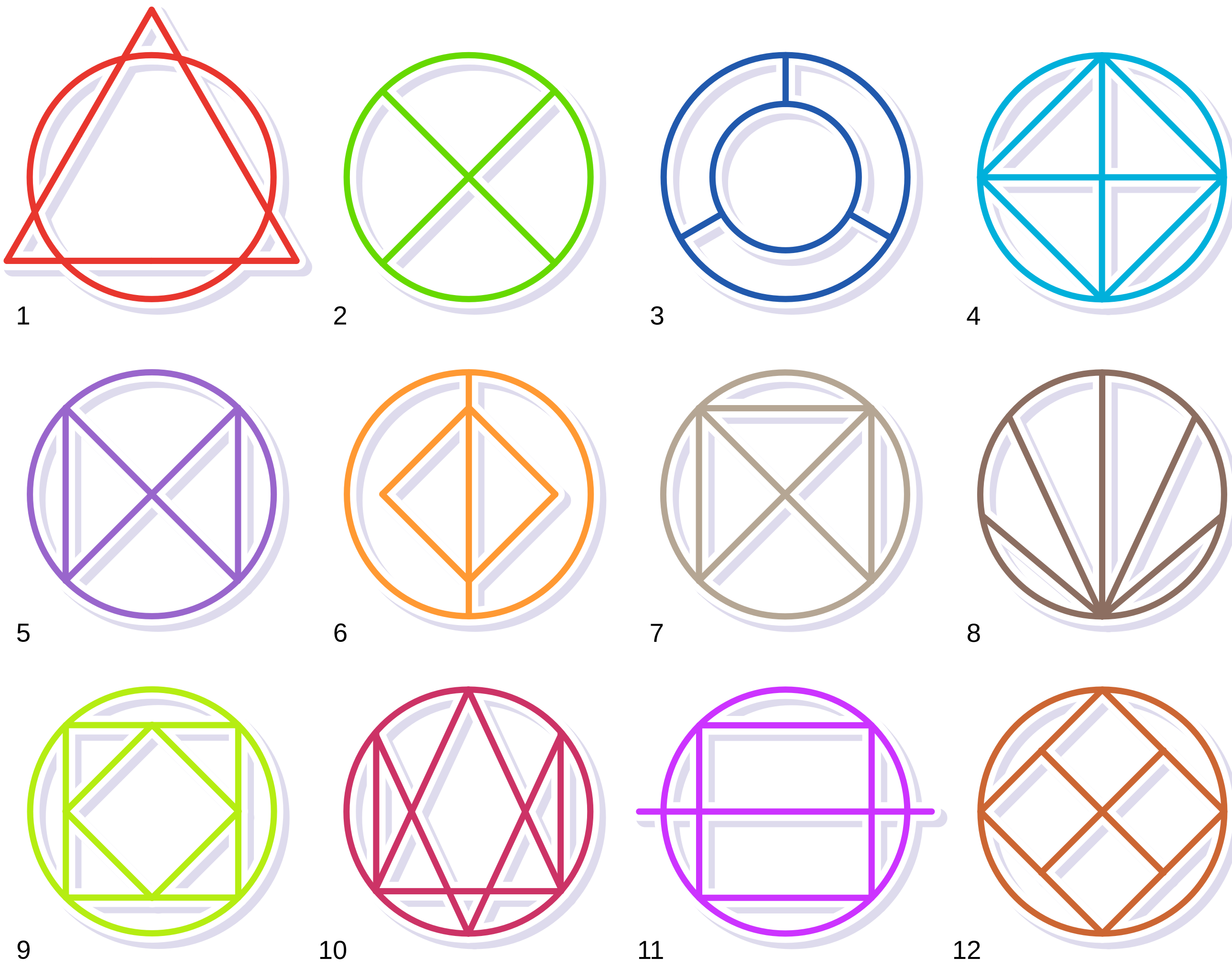
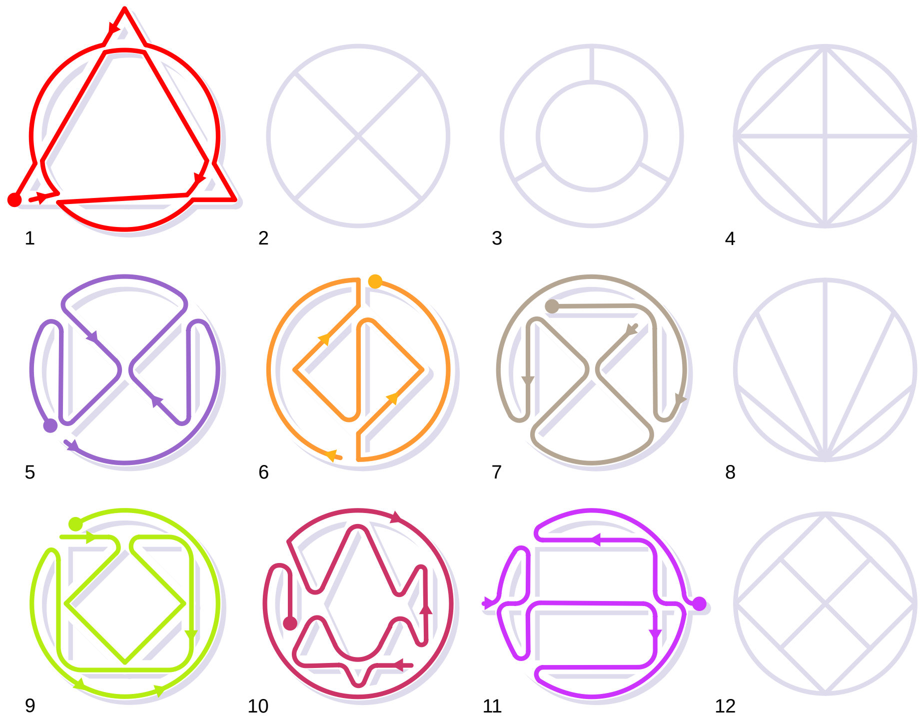


The object of this puzzle is to figure out which of the 12 patterns in the illustration can't be drawn with pencil in one continuous line so that you don't take the pencil point off the paper.

You are not allowed to go over any part of the line twice, or cross it.



The only patterns which can't be drawn with pencil in one continuous line so that you don't take the pencil point off the paper are as follows: 2, 3, 4, 8, 12.

Possible solutions to the remaining patterns are shown in the illustration.

Now using Figure 4 we'd like to explain why it's impossible to draw it with pencil in one continuous line so that you don't take the pencil point off the paper, or why it isn't unicursal.

Figure 4 has exactly four points (nodes) where an odd number of lines are branching out (5 at each), and one node in the center of the pattern with an even number of branches (4).

Every time you go through a node not stopping at it you must of necessity use a pair of its branches. Therefore at each of the four nodes on the periphery of the pattern one branch in any case will be alone. When we use this alone branch this means that our line either starts from this node or just finishes at it. Thus we have FOUR points (nodes) where the line has to start (or finish) doesn't matter how to draw it. But a continuous line has only TWO ends, so the puzzle can't be solved.

Same proof is true and for the rest of "impossible" figures in our set - 2, 3, 8 and 12.

ANY figure that has only TWO points (nodes) where an odd number of lines are branching out, and ANY number of its nodes with an even number of branches, CAN BE DRAWN in one continuous line. You just have to start at one "odd" point and finish at the other. See Figures 6, 7, 10 and 11 (figure 11 has two "free" ends which are "odd" nodes too, but just with one branch each).

And finally an excellent thing about all unicursal figures is that you ALWAYS can draw in one continuous (and even closed in loop!) line ANY pattern if ALL its nodes are "even." See Figures 1, 5 and 9.