

Toothpick Geometry

Grade Levels

This activity is intended for all grade levels, K–12.

Objectives and Outline

The goal of this activity is to develop geometric visualization skills and proof techniques. Students will be given a toothpick configuration and will have to remove or rearrange a specified number of toothpicks to create a new configuration with certain attributes. As they master each problem, the students will see how solving it can be useful for solving the harder problems. It should be noted that several of these problems have multiple solutions. Instruct the students to pay attention to the instructions carefully.

Materials and Resources

- [Student Worksheet \(see below\)](#)
- Toothpicks (largest puzzle contains 24)

Solutions

Solutions can be found at the [end of this document](#). However, be sure to try and solve them on your own first!

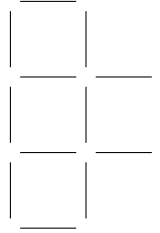
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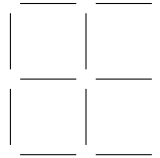
DEPARTMENT OF MATHEMATICS

Toothpick Geometry

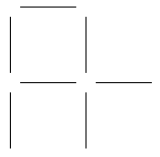
1) Remove one toothpick to leave only three squares.



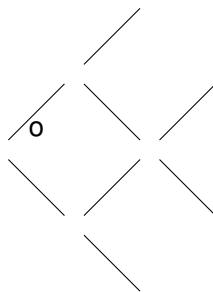
2) Remove two toothpicks to leave only two squares.



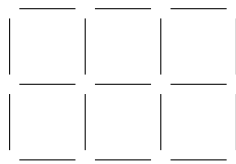
3) Remove two toothpicks to leave only two squares.



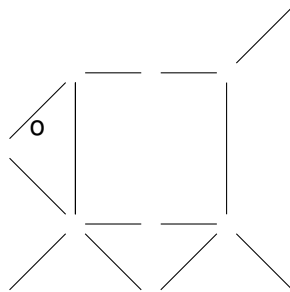
4) Make the fish swim the opposite way by moving three toothpicks.



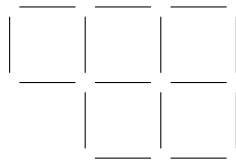
5) Remove six toothpicks to leave only two squares.



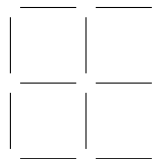
6) Move two toothpicks to make the pig go the opposite way (he will be running scared!).



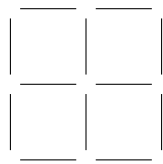
7) Remove three toothpicks to leave only three squares.



8) Move four toothpicks to make only three squares.



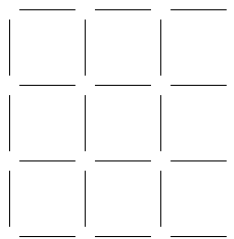
9) Move four toothpicks to make only four triangles and only two squares.



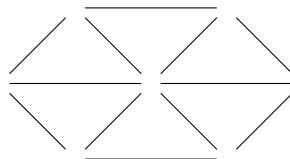
10) Move two toothpicks to make only five triangles and only one square.



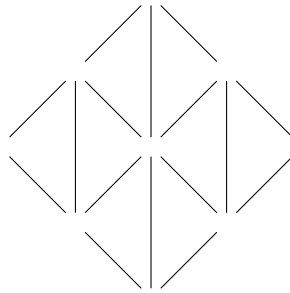
11) Remove eight toothpicks to leave only three squares.



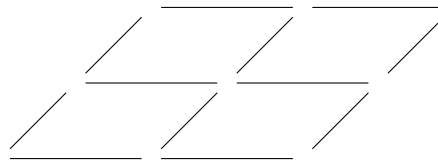
12) Move four toothpicks to leave only three equilateral triangles (the diagram is not drawn to scale).



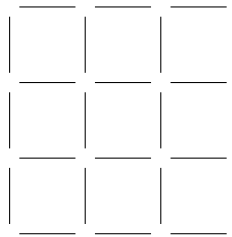
13) Remove six toothpicks to leave only four triangles.



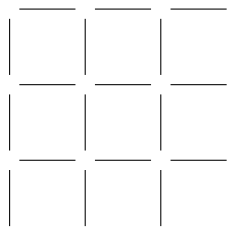
14) Move two toothpicks to make only four triangles.



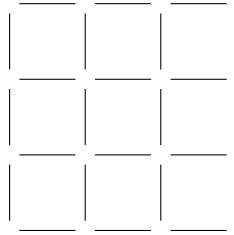
15) Move six toothpicks to make only twelve triangles and only seven squares.



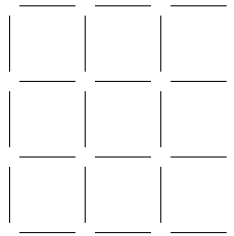
16) Move six toothpicks to make only seventeen triangles and only seven squares.



17) Move four toothpicks to make only eight triangles and only seven squares.

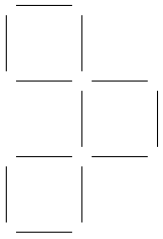


18) Move four toothpicks to make only nine triangles and only seven squares.

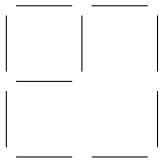


Solutions

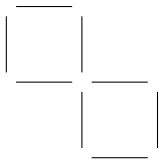
1)



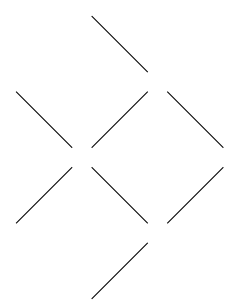
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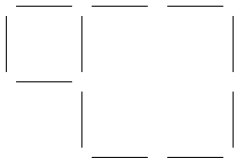
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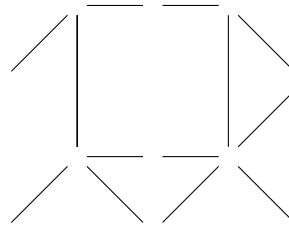
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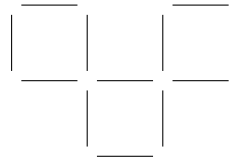
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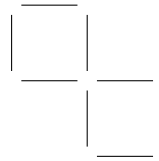
6)



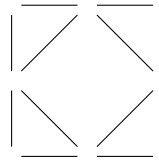
7)



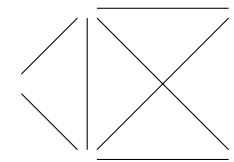
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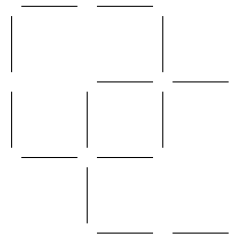
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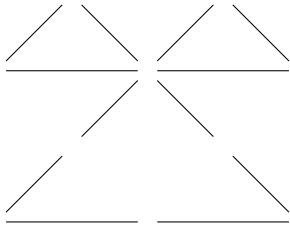
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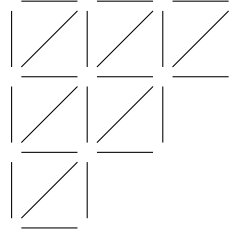
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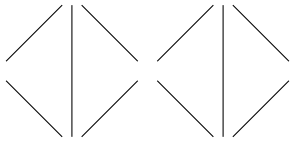
12)



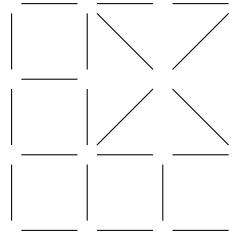
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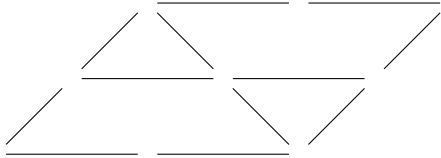
13)



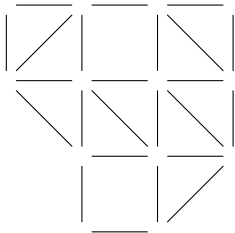
17)



14)



15)



18)

