

Stomachion (Archimedes' Box)

The Stomachion is thought to be the oldest known puzzle, first created by Archimedes in Ancient Greece. The puzzle contains 14 pieces, originally in a square, that can be arranged in a multitude of different shapes.

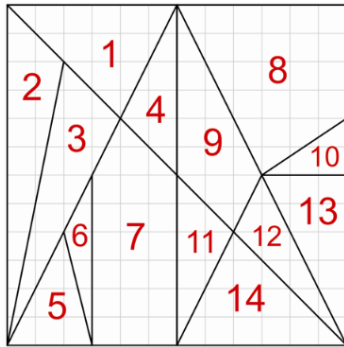
Your Task: Mix up the pieces of the Stomachion and see if you can put them back into a square. Spend a few minutes with this. You may find it incredibly difficult, however there are 536 unique ways to fit these 14 pieces perfectly into a square.

Hint: If you are struggling with the square, try something with a few less pieces!

- Using the two right triangles and the larger quadrilateral, form a right triangle. Set those aside. Can you come up with three other combinations that will create a right triangle of the same size? Once you've done this, try the square again!

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1. What are some things your group noticed as you were trying to put the pieces back into a square?
 2. What defines a solution to the puzzle? If you flip two pieces that are the same size and shape is that a different solution? What if you rotate the puzzle, is that a new solution? Why or why not?

Here is a possible solution:



3. With the given solution, how many other different solutions can you find using rotations and reflections?

There are a few shapes in the Soma cube that can be formed from other shapes.

- For example, can you form shape 7 using other shapes in the puzzle?
 - What if you put shapes 8 and 10 together, are there other shapes that will form those?
 - These pieces, shapes 2 and 3 and shapes 5 and 6 will always appear together as shown above in every solution of the puzzle
 - Now mix up the shapes again and try to put them back into a square (no cheating, don't look at the solution above).
4. Was it easier this time? Why? Will this information help you find more of the 536 solutions?

There are many other shapes that can be created using all 14 pieces of the

Soma cube. Try a couple of the ones below! Can you find any others?

