DISSECTIONS 12

Print ‘n’ Play Collection

Of the 12 Dissection Puzzles

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DISSECTIONS 12 Puzzles

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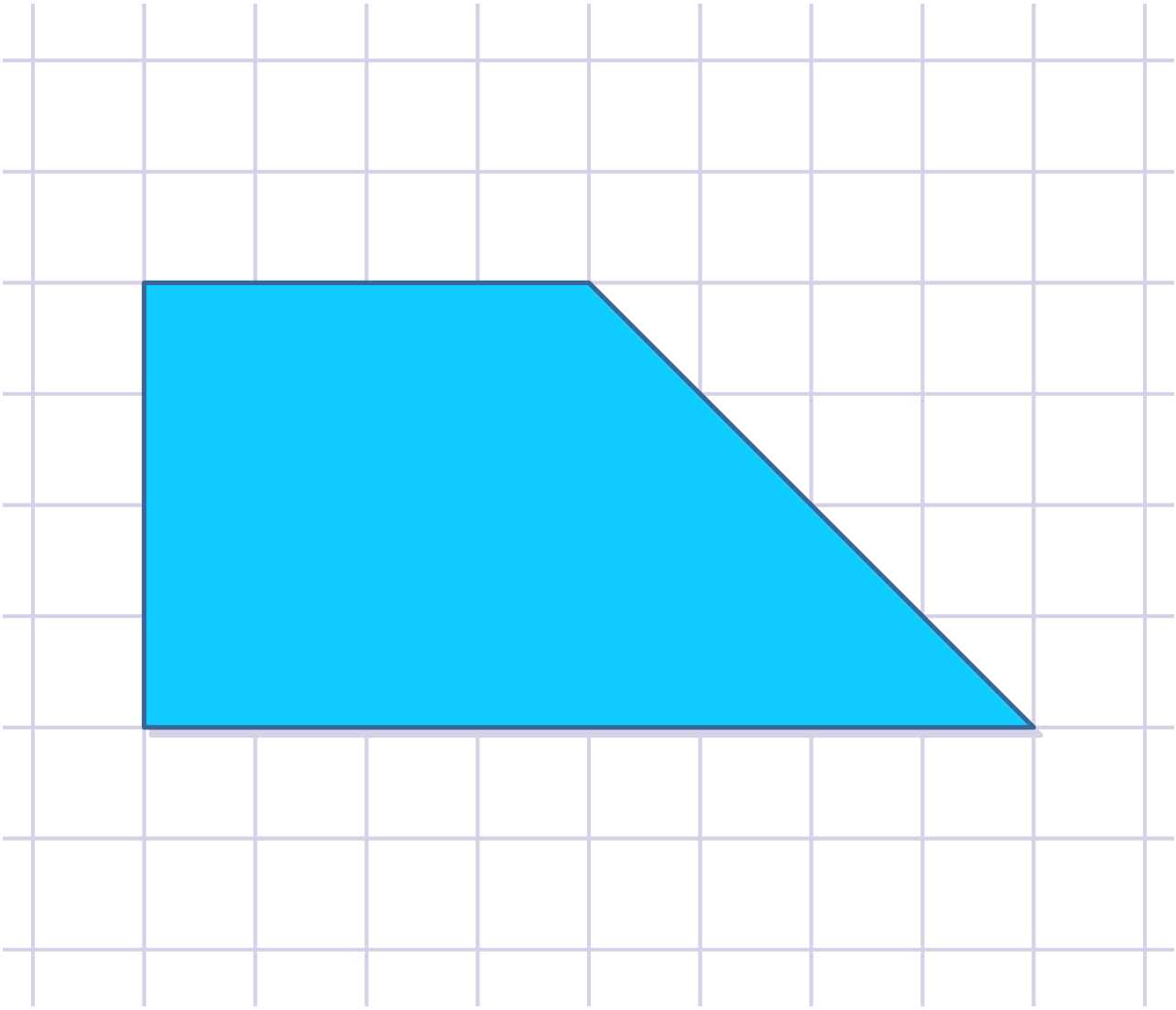
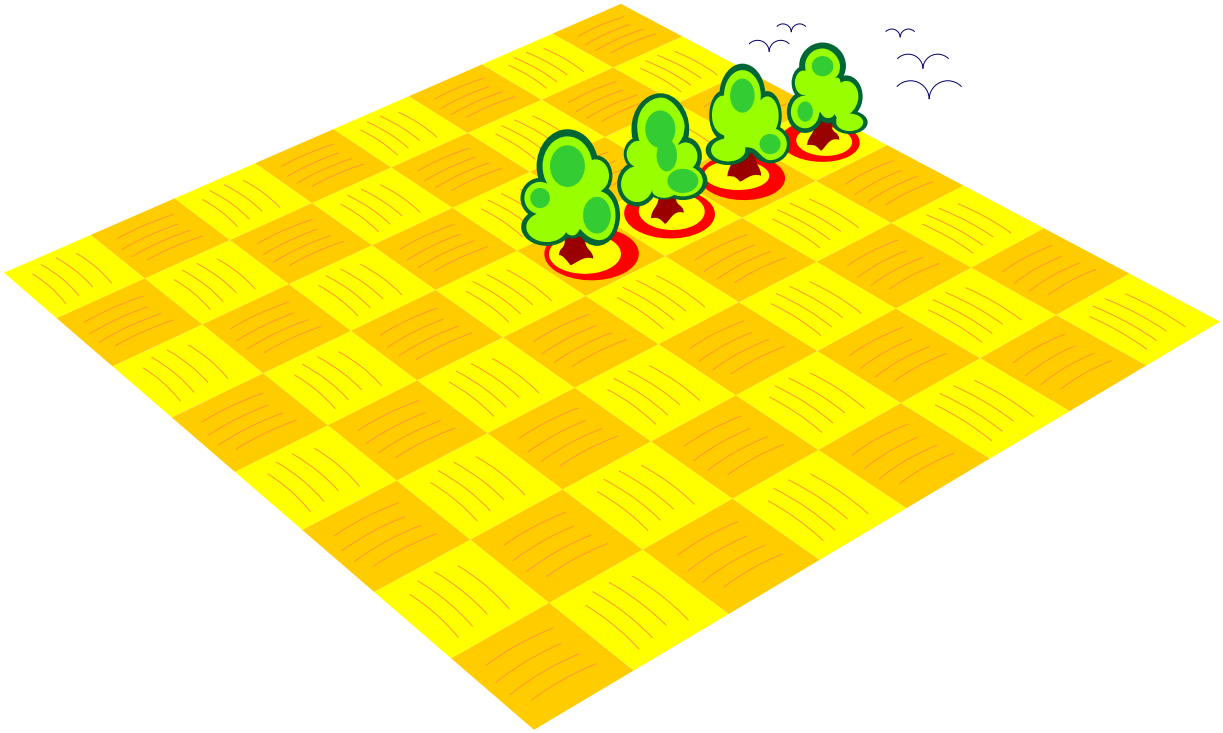


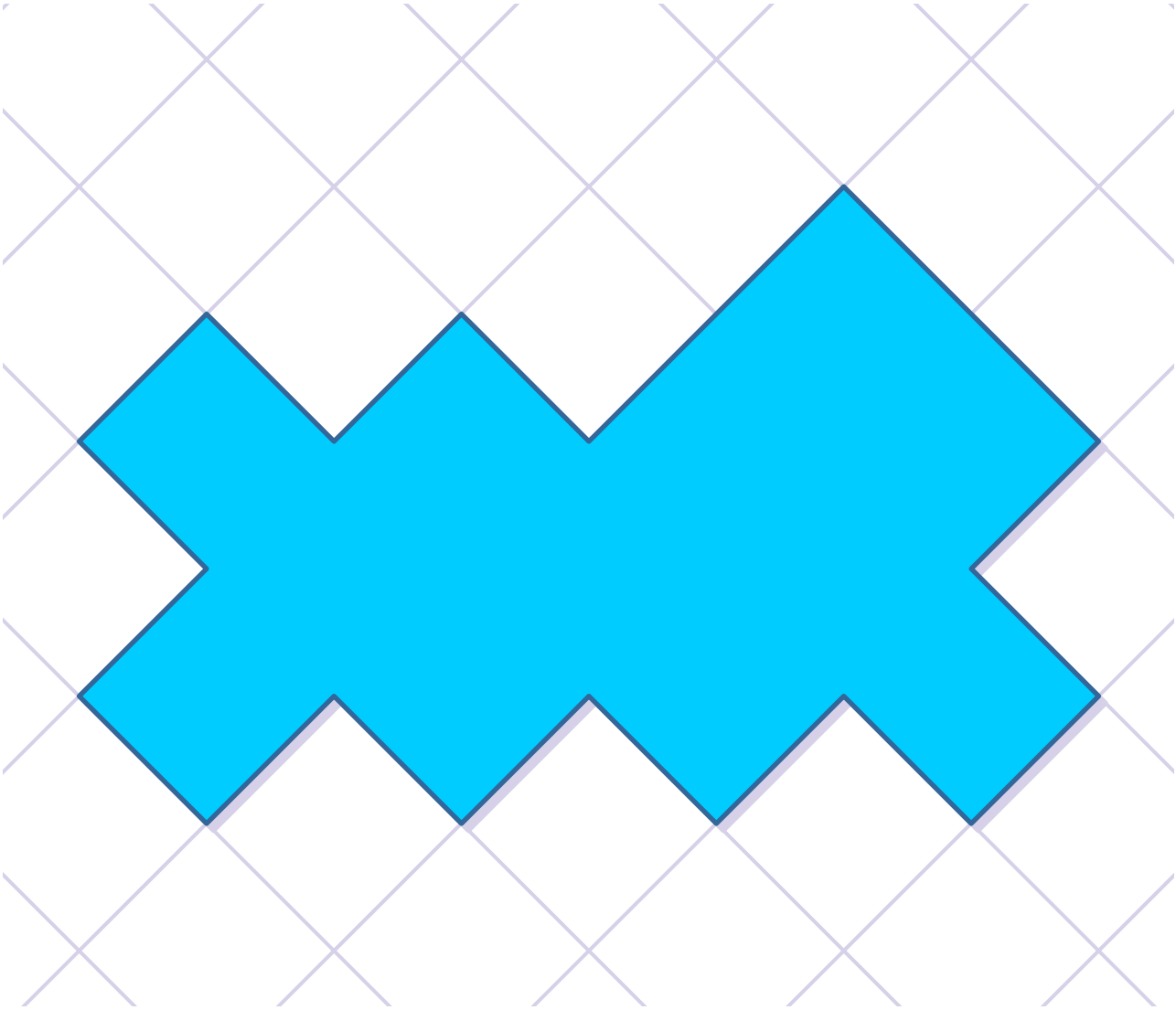
The goal of this puzzle is to divide the above figure into four pieces which would be identical in their shape and size, though some pieces can be mirror reflections of others.



One man left to his four sons a square field with four ancient oak trees served as landmarks. This tract of land is shown in the illustration above. The sons were instructed to divide the field into four pieces of the same size and shape, and so that each piece of land contains one of the oak trees.

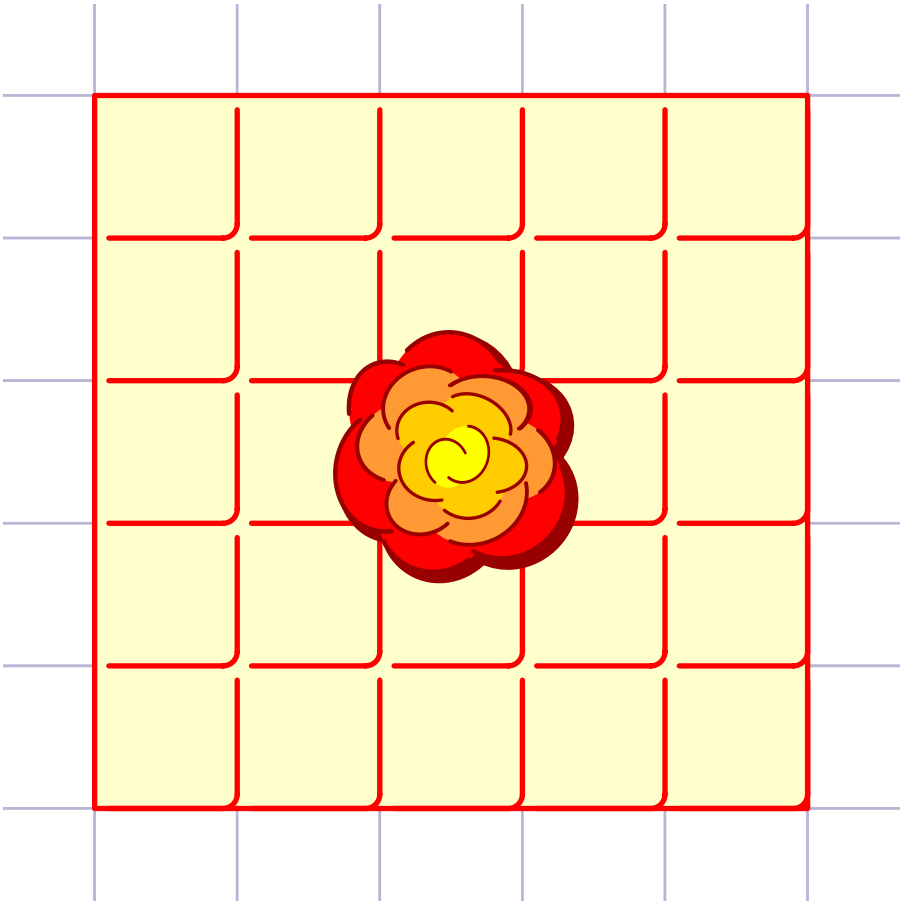
The sons were unable to divide the land properly, and finally squandered the estate. It's a very old story known as the "battle of the four oaks".

But the task still remains: how can it be done? Try to find the right solution for this classic puzzle.



Draw the figure as shown in the illustration or just print it out.

The goal is to make a cut (or draw one line) - of course it needn't be straight - that will divide the figure into two identical parts.

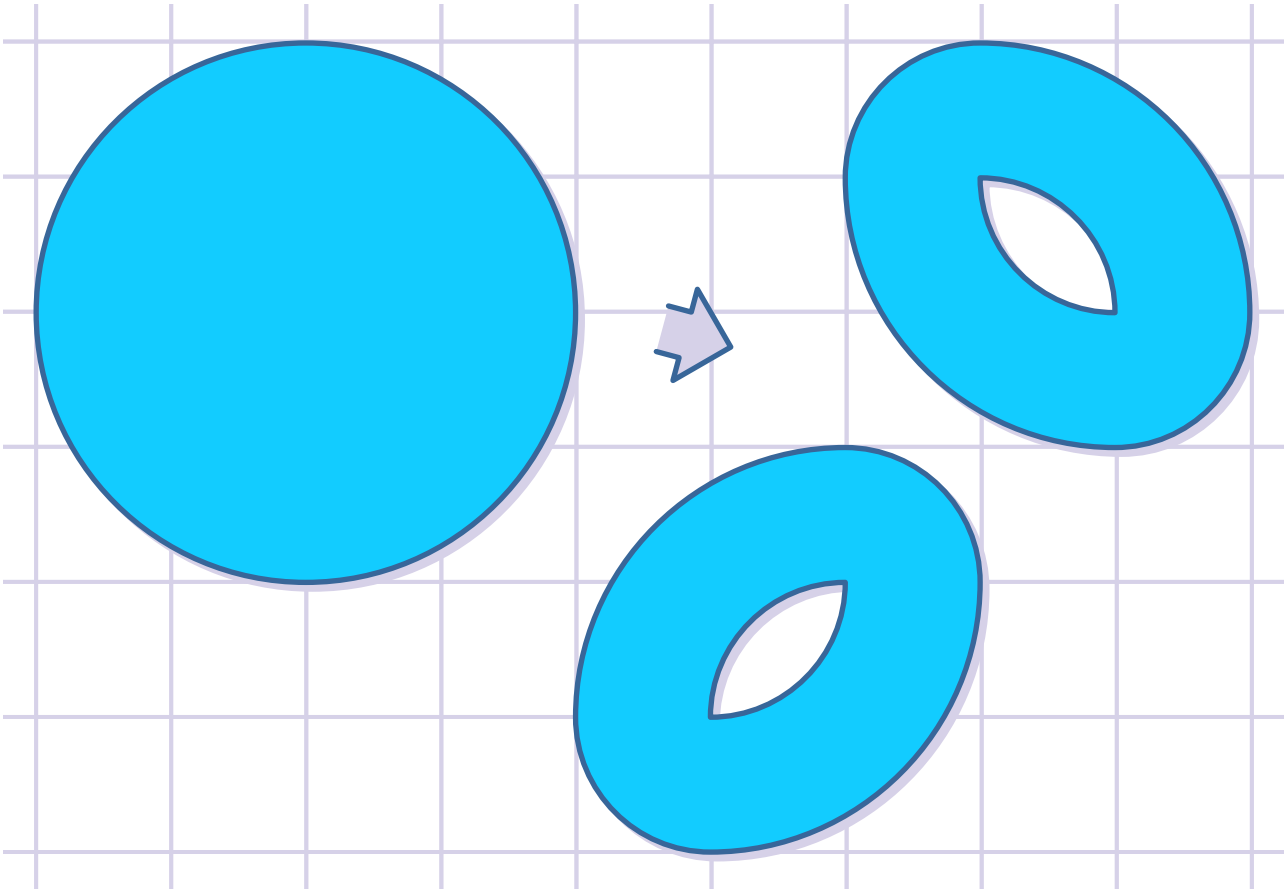


A square with a 5x5 grid on it represents a tasty cake like that shown in the illustration.

Your task is to divide this cake into five pieces in such a way that each piece has the same volume.

All the cuts must be "conventional" - each cut has to go straight exactly from the central point of the cake to its edges, and every cut's plane has to be perpendicular to the cake's base. In this case we'll consider any two pieces as being equal if their top surfaces are equal.

To solve the puzzle you are not allowed to use any measuring tools except the square grid itself and the central point of the cake (the center of a 5x5 square).



The object of this puzzle is to divide the circular table top (disk) into certain number of pieces that could be rearranged into the seats of two oval stools with open handholds as shown in the illustration. What is the fewest number of pieces required to complete this task?

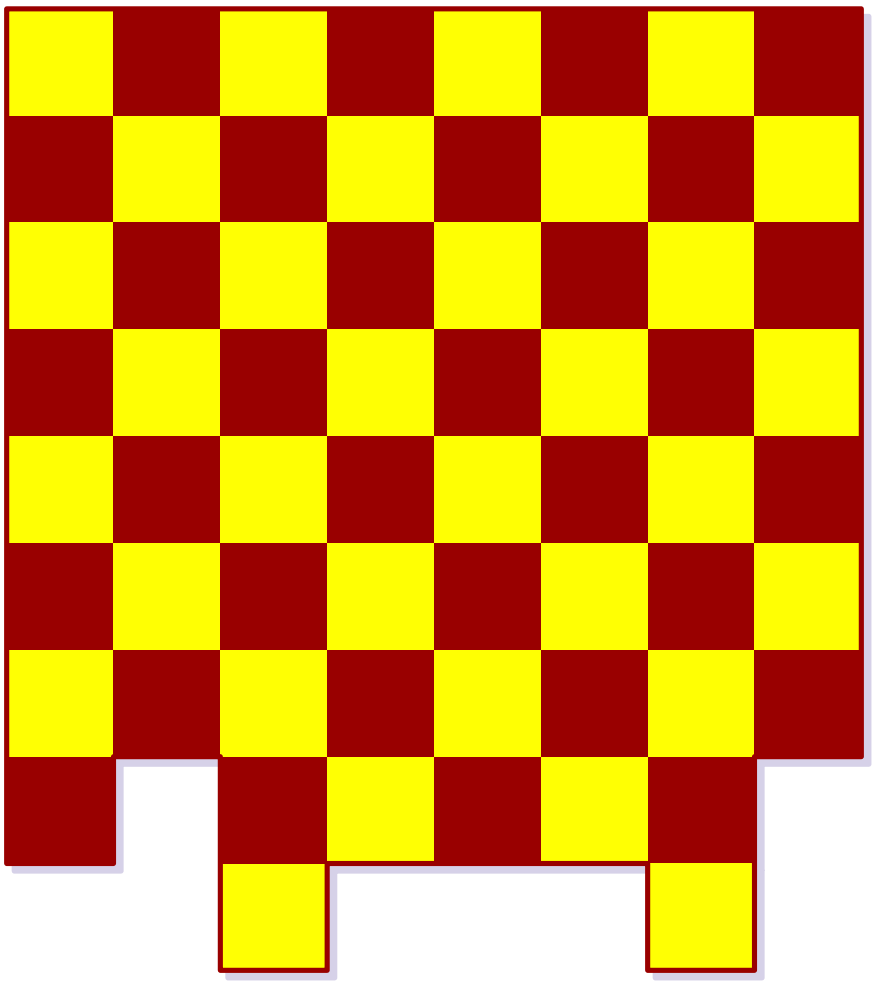
John Jackson proposed this puzzle in 1821 and his solution contained eight pieces. Eighty years later, in 1901, Sam Loyd demonstrated the solution which consisted of six pieces only. And recently, in 2004, more than a century later, when almost everyone thought Sam Loyd had brought the puzzle full circle, Serhiy Grabarchuk came up with an astounding solution, or even series of solutions, which consisted of five (!) pieces.

Which of these solutions can you discover?

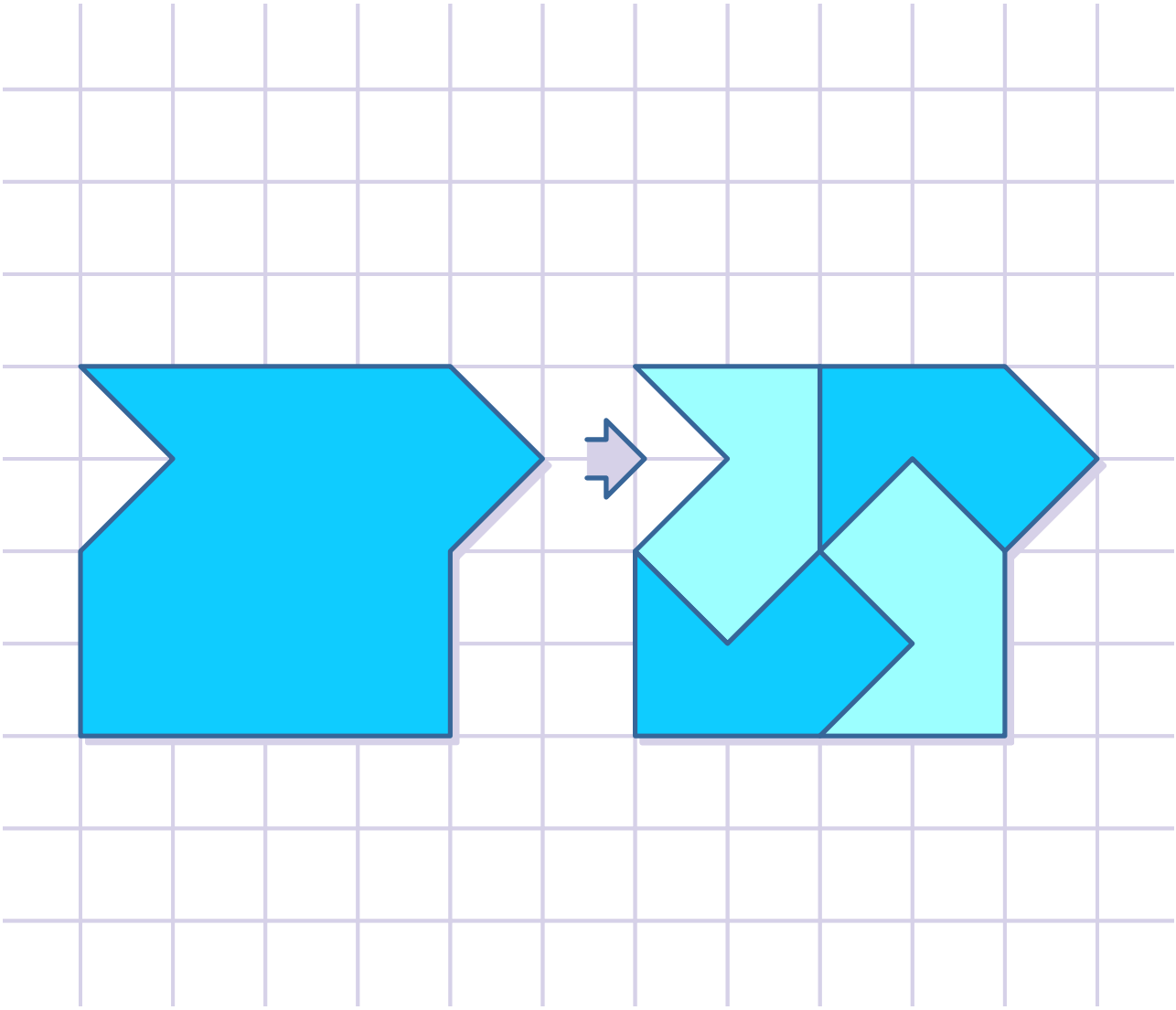
More comprehensive research on this and similar dissection puzzles can be found in the *Dissections: Plane & Fancy* book by Greg Frederickson.

Improvised Chessboard

by Henry E. Dudeney

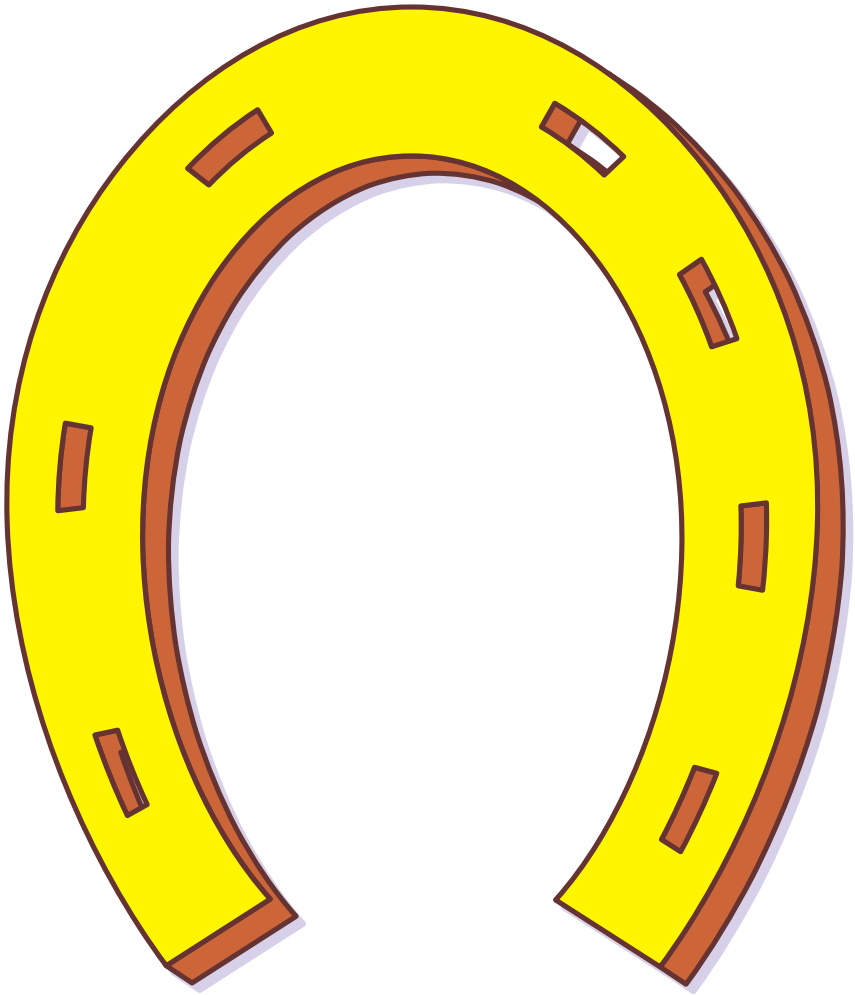


Two light squares have been cut off the 8x8 chessboard and pasted to it again into the new places as shown in the illustration. Now the object is to divide this board into only two pieces that will form a perfect chessboard again.



The polygon shown in the illustration above (the shape at the left) can be dissected into four congruent polygons as shown in the right shape.

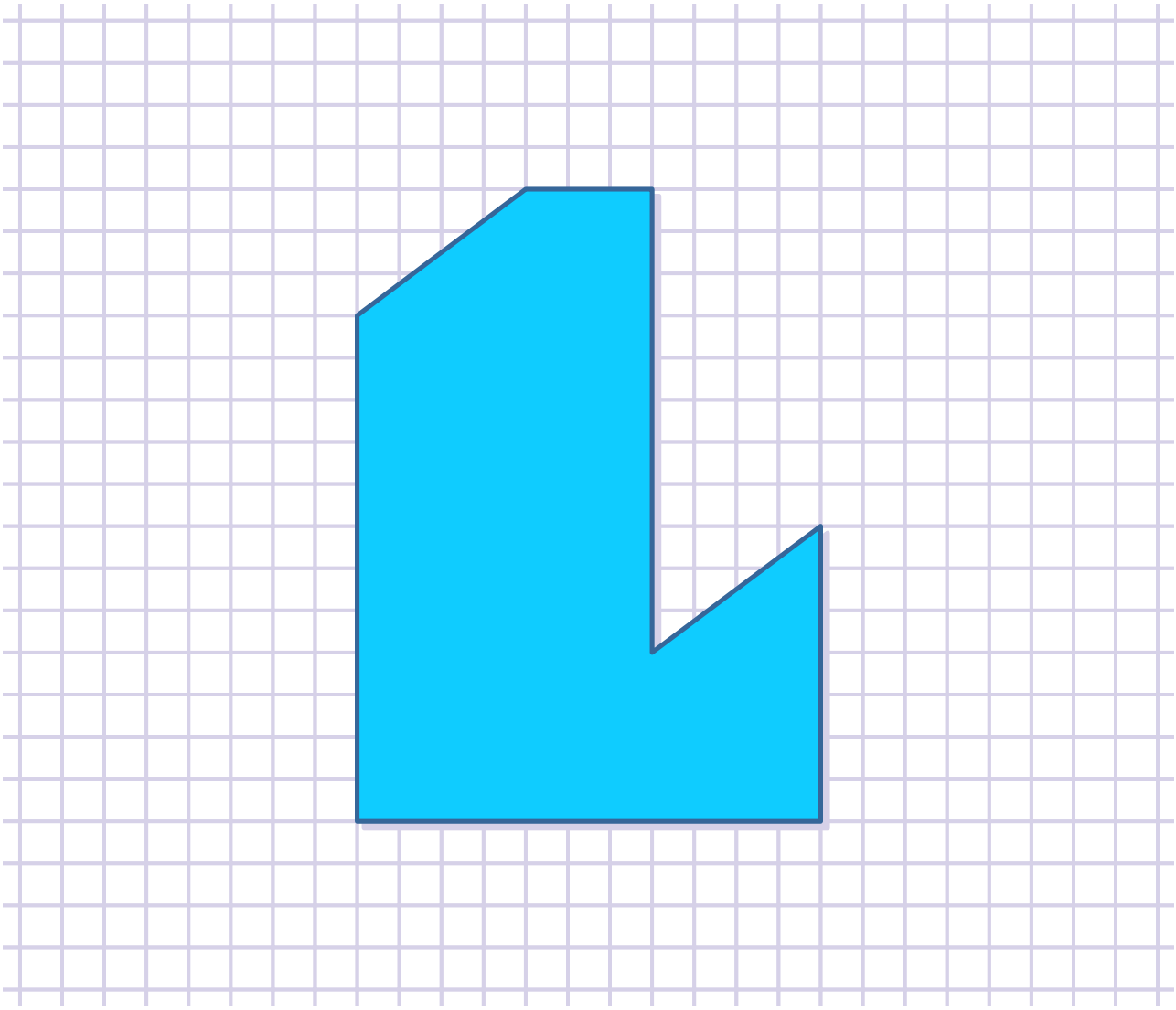
Can you find the only way how to dissect this polygon into five congruent polygons?



With two straight cuts divide the horseshoe shown in the illustration into seven pieces, with one nail hole in each piece.

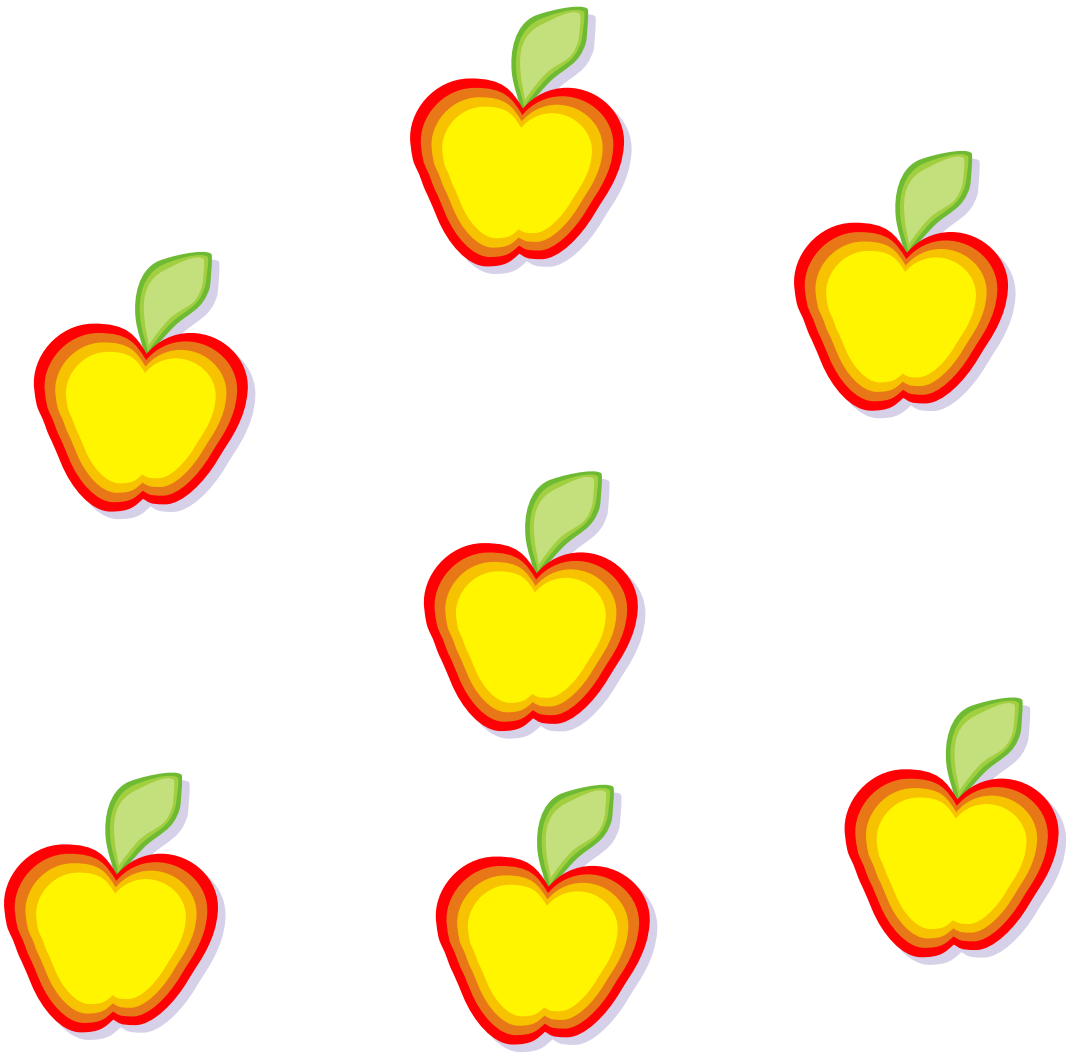
Before the second cut you're allowed to pile up the pieces you have got after the first one as you will wish, and then cut 'em all.

The cuts must be straight, and you aren't allowed to fold or bend the paper.

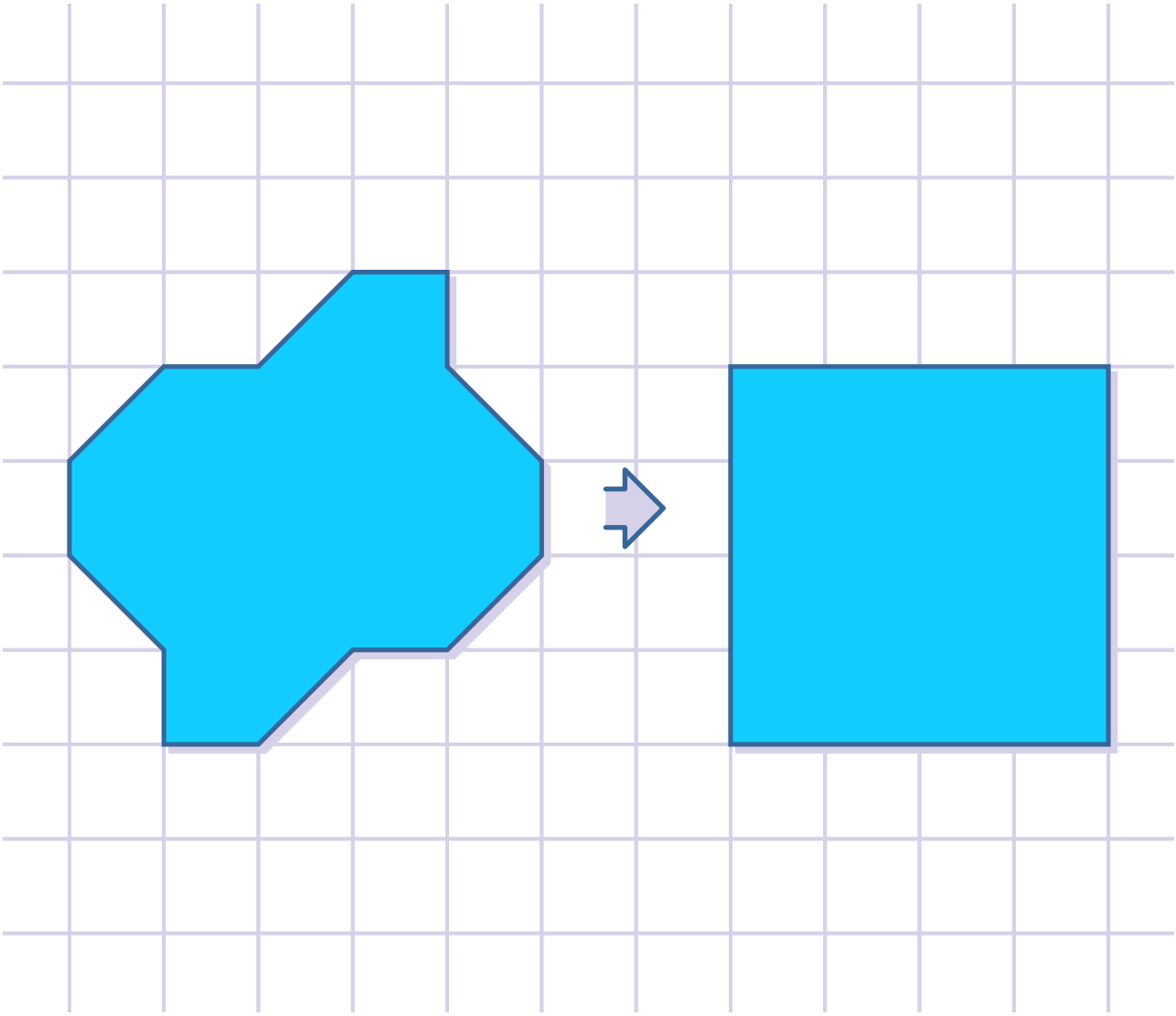


Draw the figure of the sedan chair using a square grid as shown in the illustration.

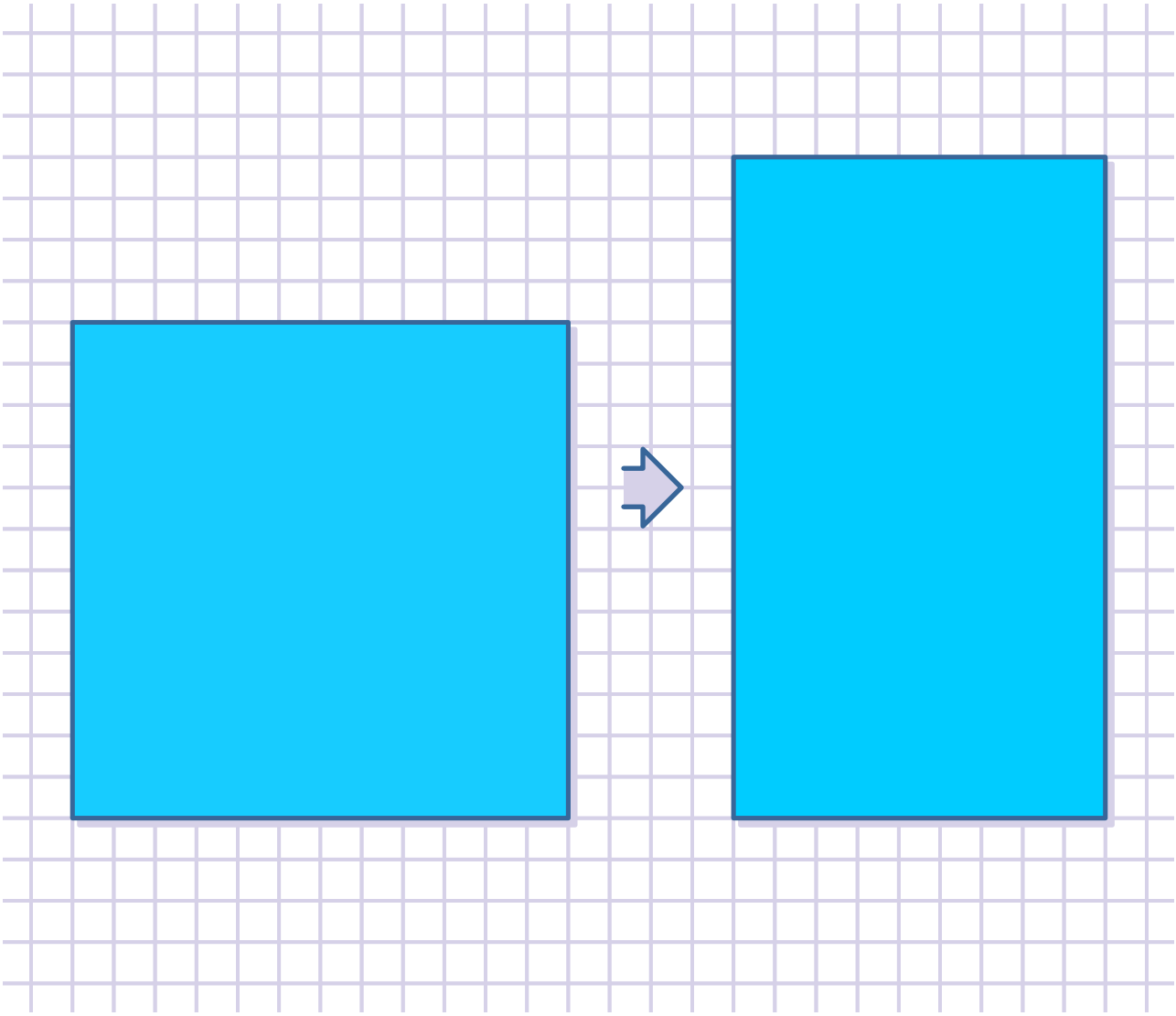
Now divide this sedan chair into the minimum number of pieces so that to make from them a perfect square.



Divide the image of apples above with three lines into seven sections each containing exactly one apple.



Divide the left figure shown above into four identical parts (of the same shape and size) which may form a square.



Divide the 12x12 square on the left into two pieces so that to rearrange them into the 9x16 rectangle on the right.

DISSECTIONS 12 Solutions

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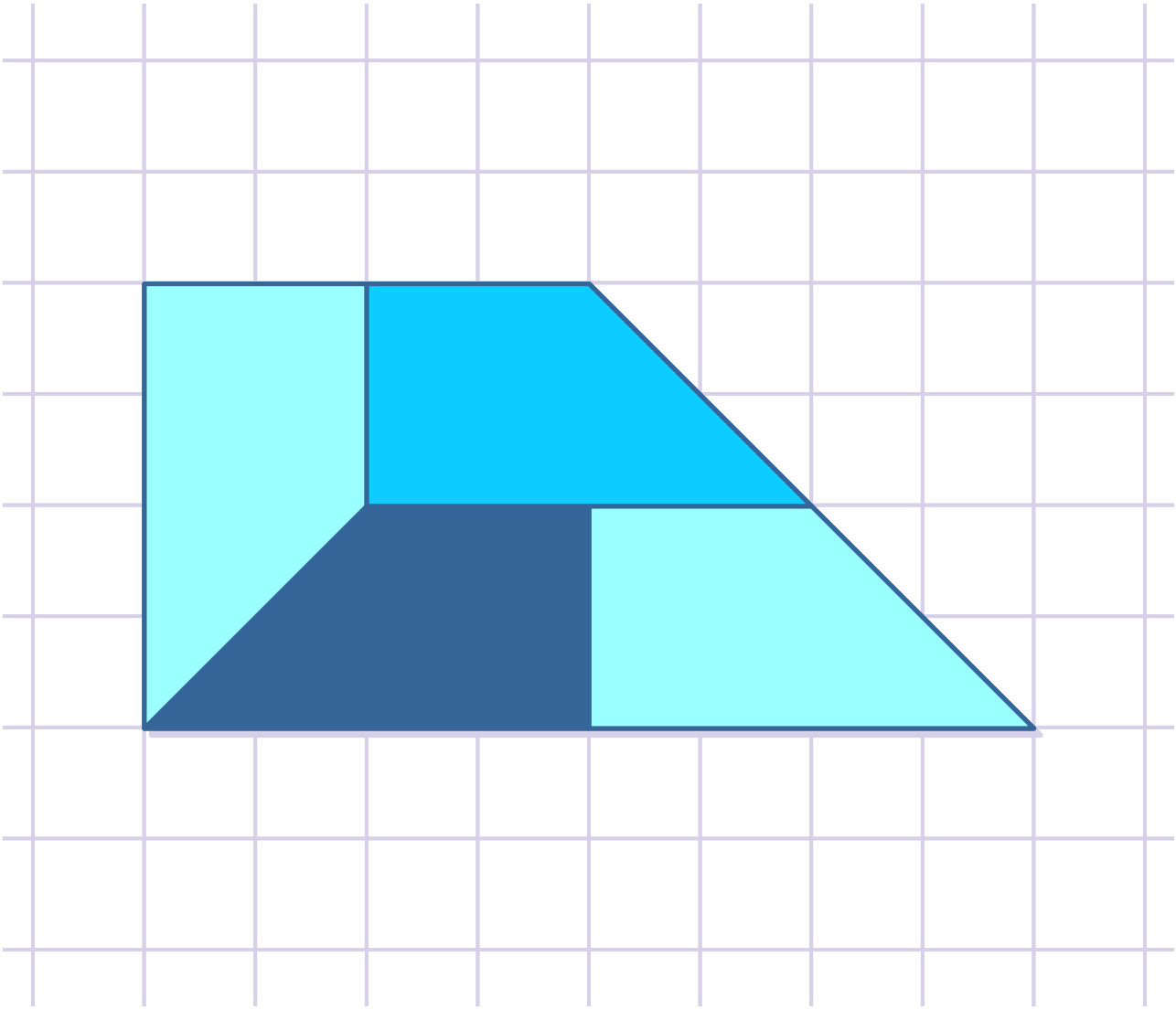
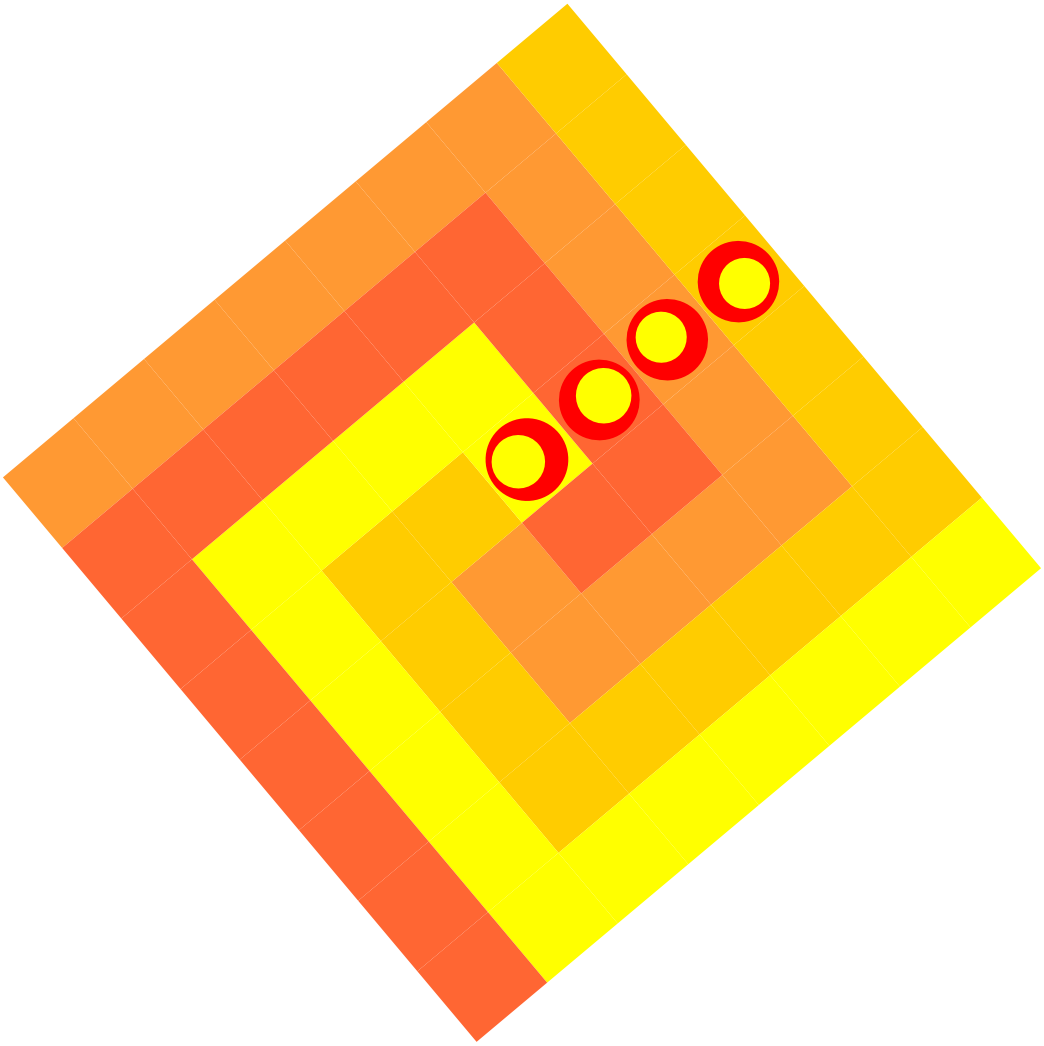
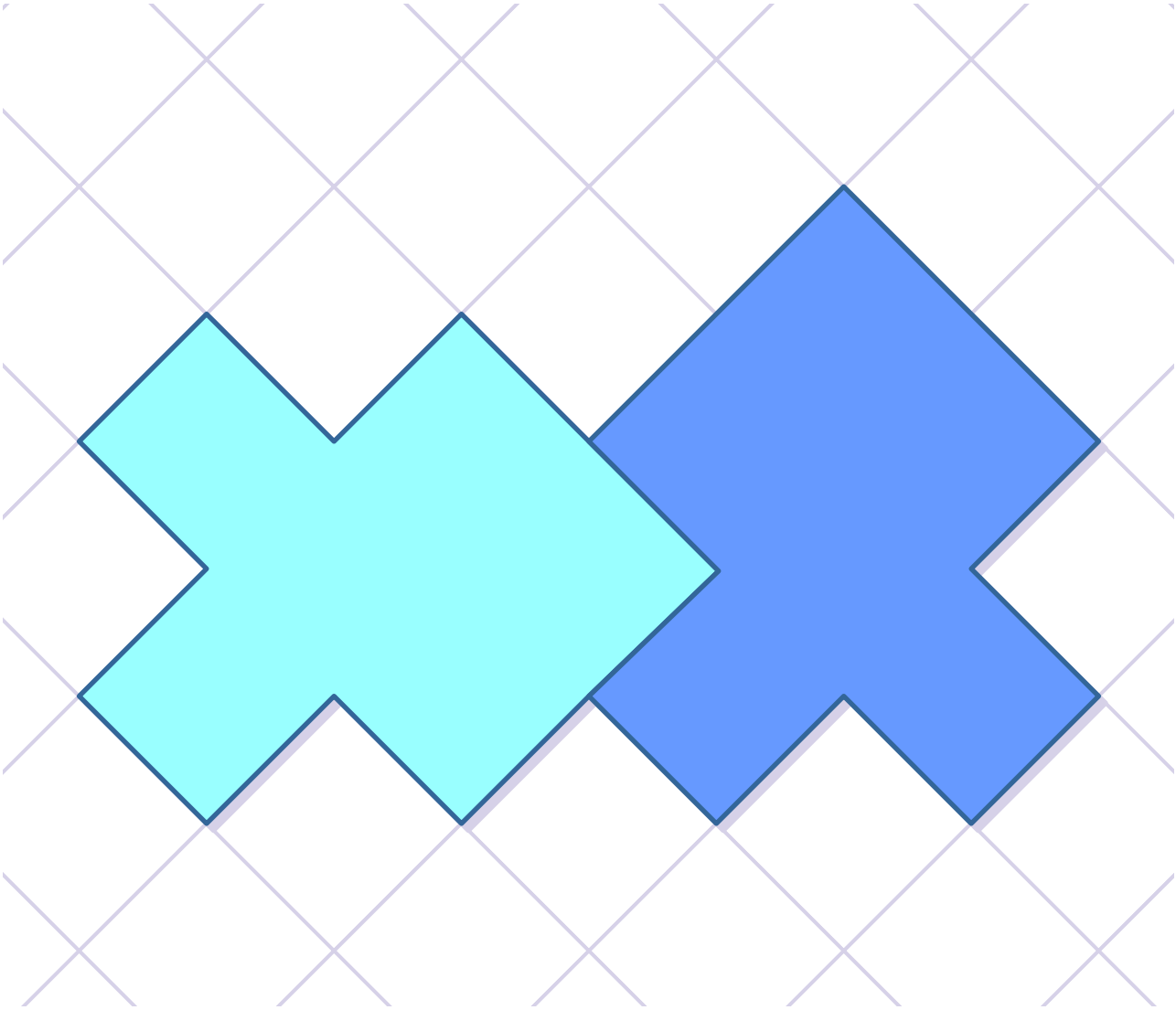
An Easy Dissection Puzzle
(Solution)



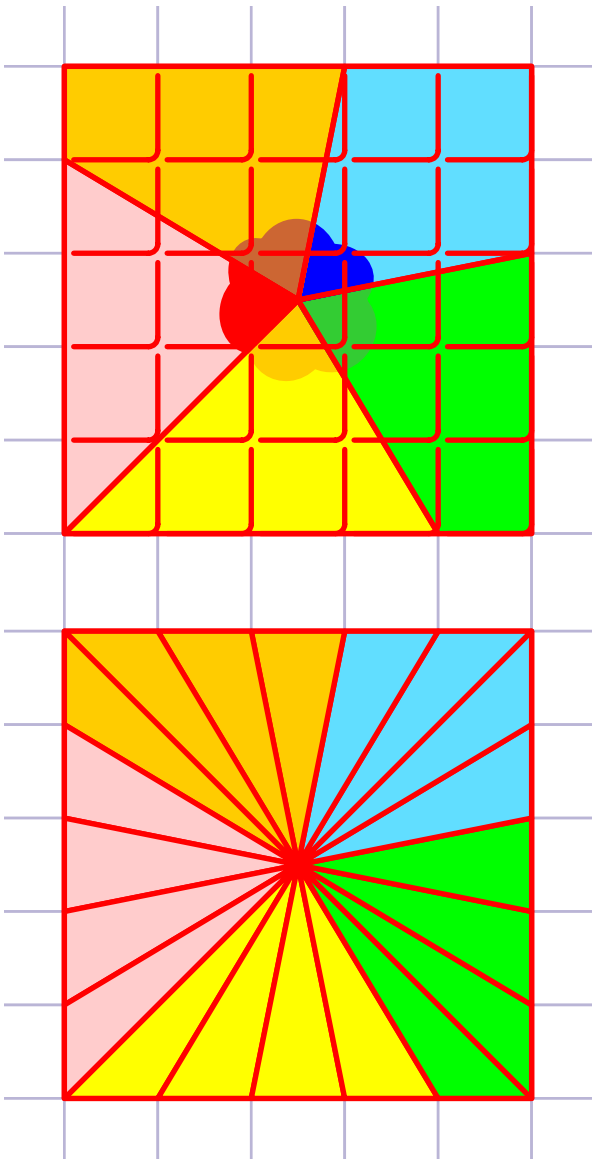
How to divide this figure into four identical pieces is shown in the illustration. Please note that these small pieces are exactly similar to the figure.



The solution is shown in the illustration.



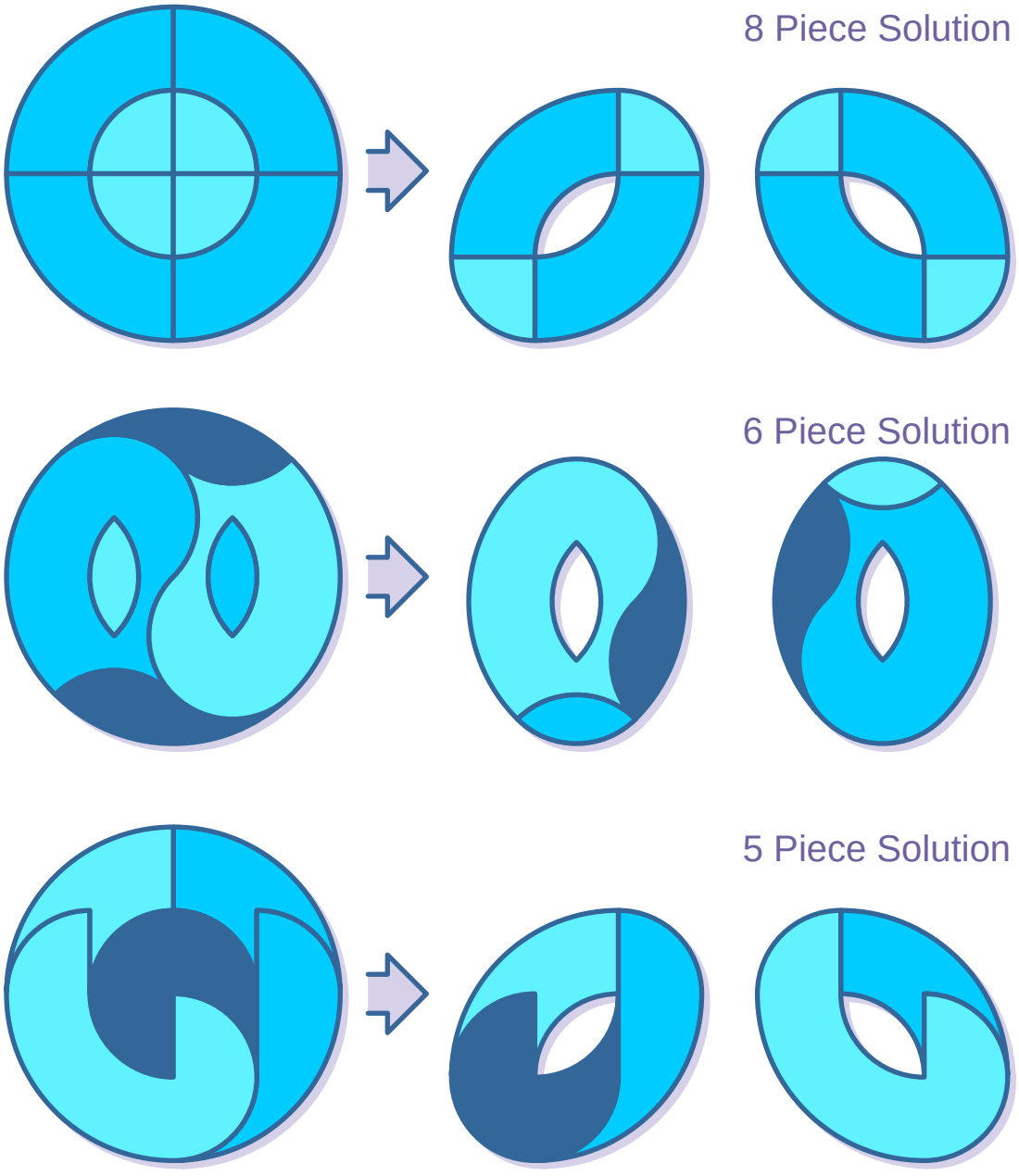
The solution is shown in the illustration.



One of the possible solutions is shown in the upper illustration.

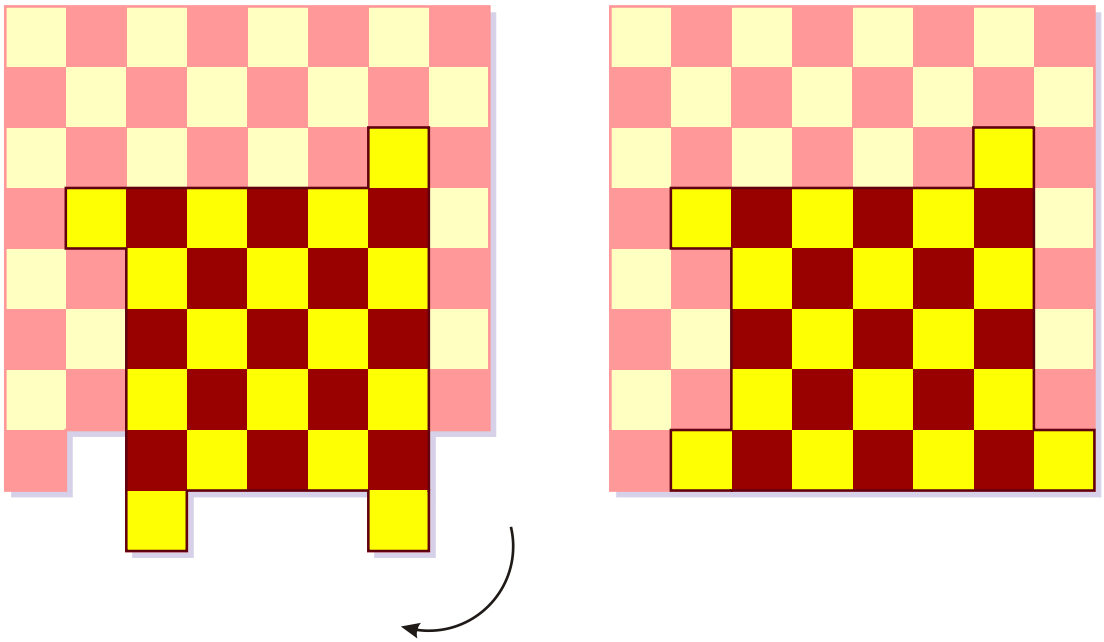
If we mark all straight cuts from the center of the cake to its edges, as shown in the lower illustration, we get exactly 20 triangles. All the triangles are equal in area - they have equal bases and the same altitude.

Therefore to get five equal parts of the cake we have to divide it into five pieces consisting of 4 small triangles each (20:5=4) as shown in the lower illustration.

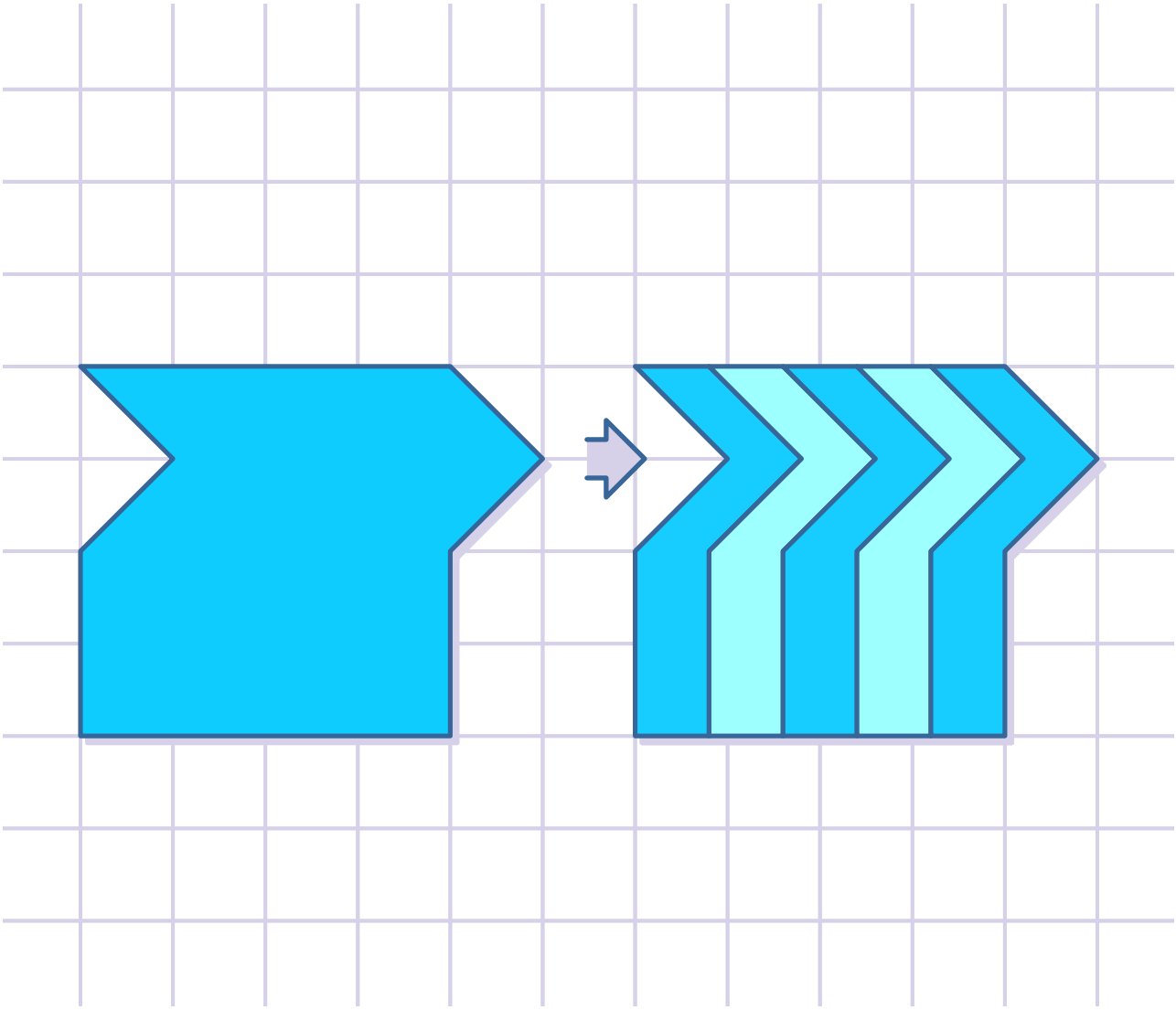


The solutions of eight, six and five pieces, respectively, are shown in the illustration.

Comprehensive presentation of the five-piece solutions can be found on the Greg Frederickson's web-site, exactly here.



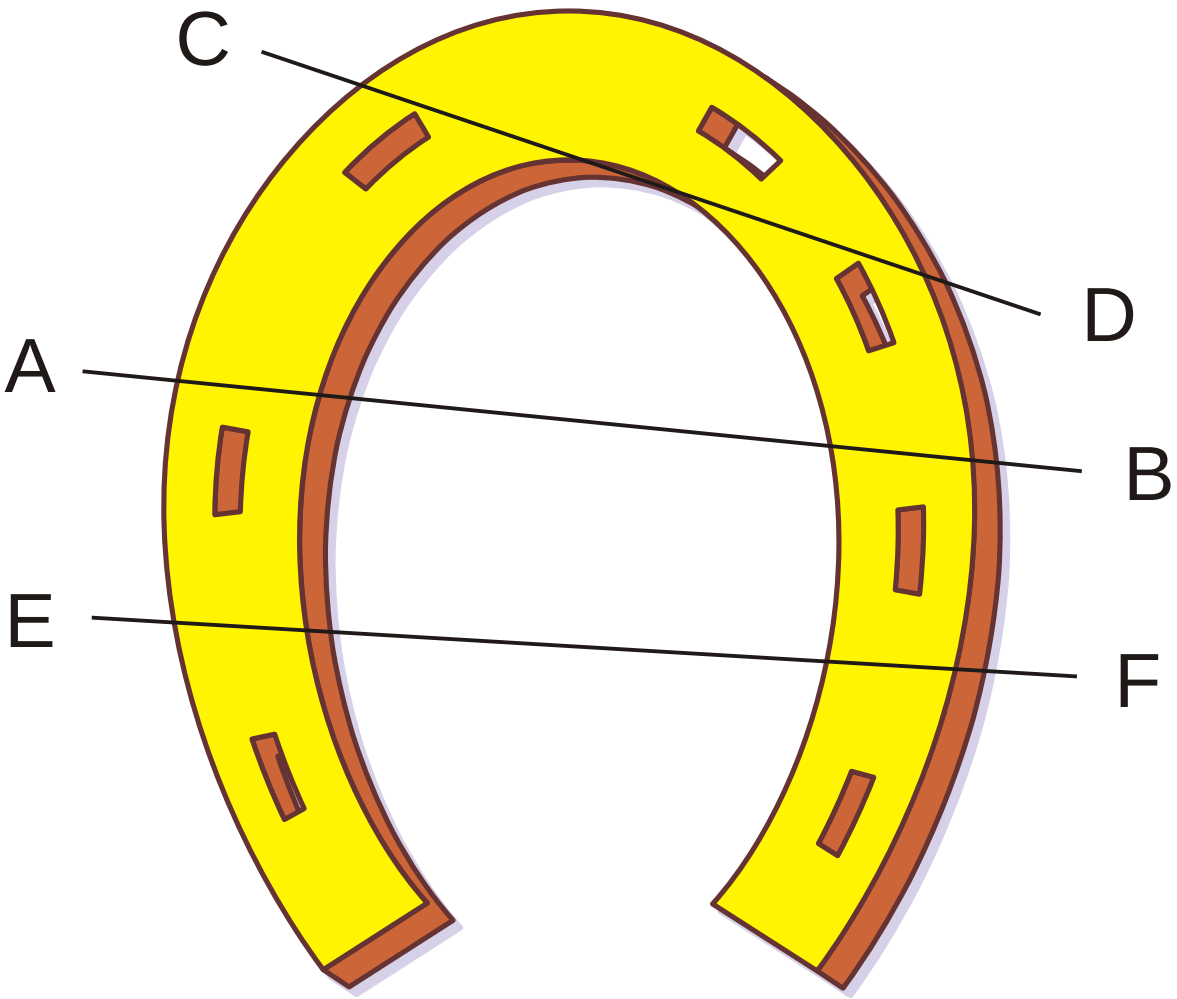
The solution is shown in the illustration.



The solution how to dissect this polygon into five congruent polygons is shown in the illustration.

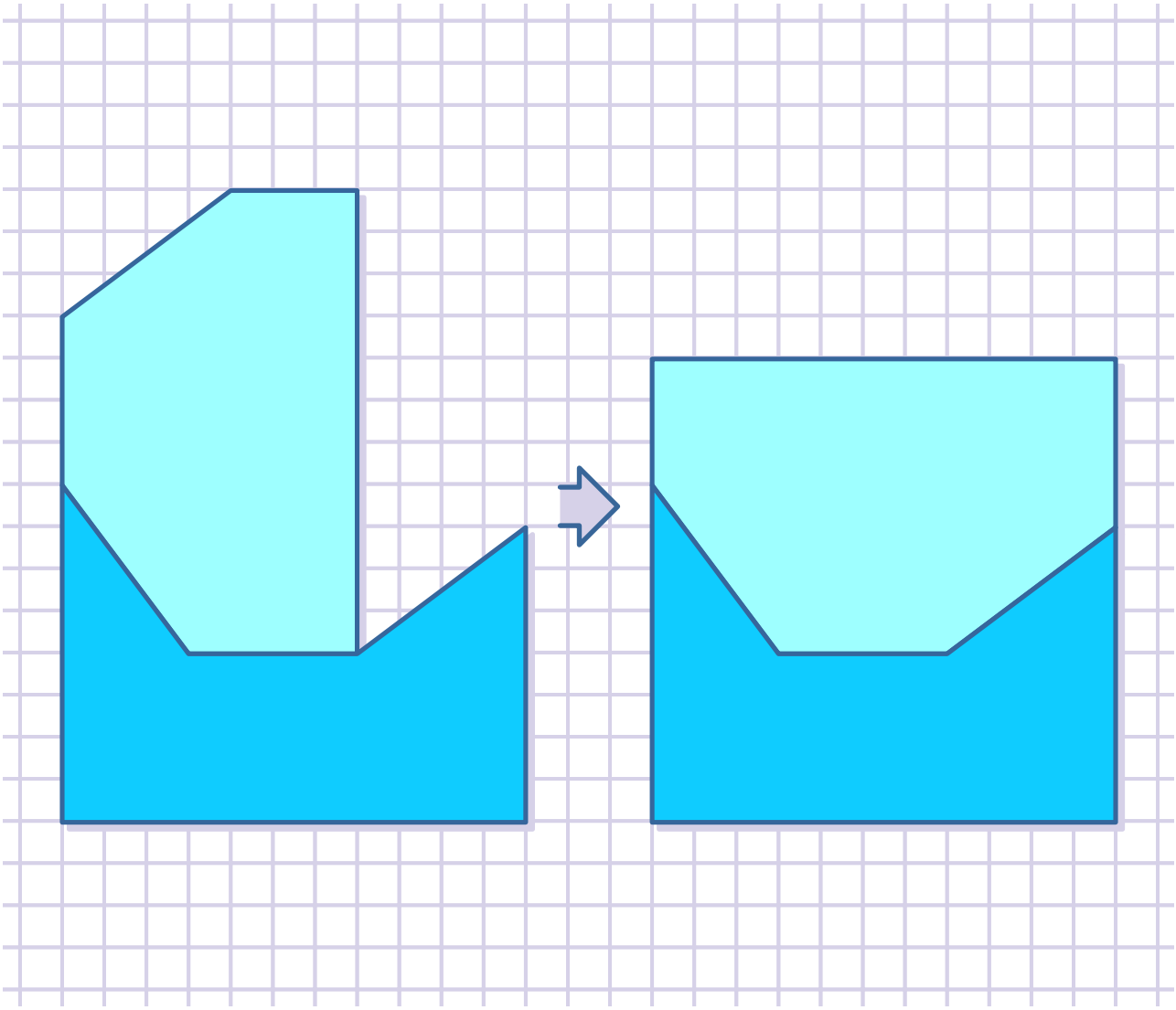
L. Vosburg Lyons first published this tricky dissection puzzle in 1969.

Martin Gardner described it in his book - Wheels, Life and Other Mathematical Amusements.

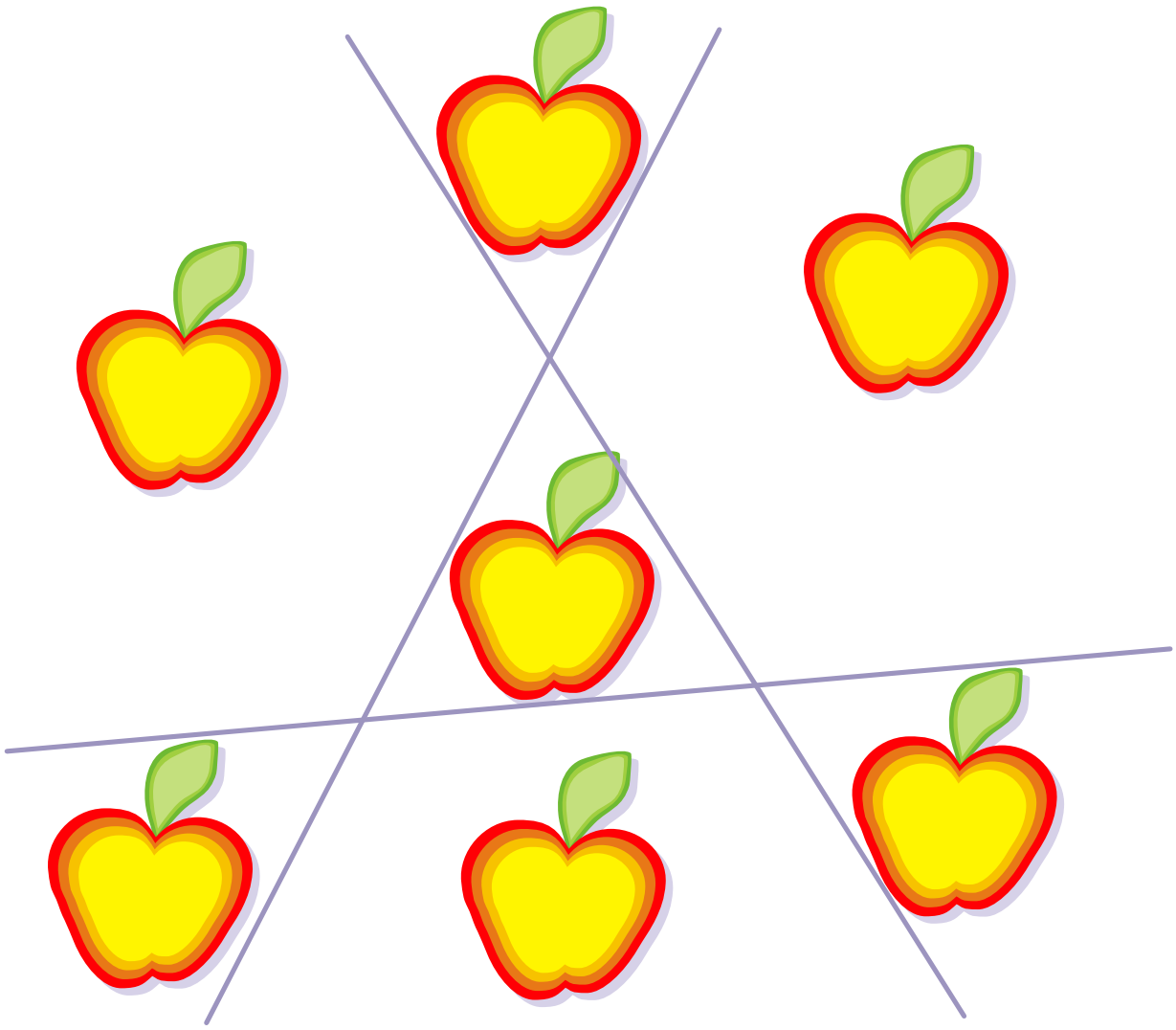


First make the cut AB to get three pieces. Then pile 'em up in such a way that the cuts CD and EF can be done simultaneously.

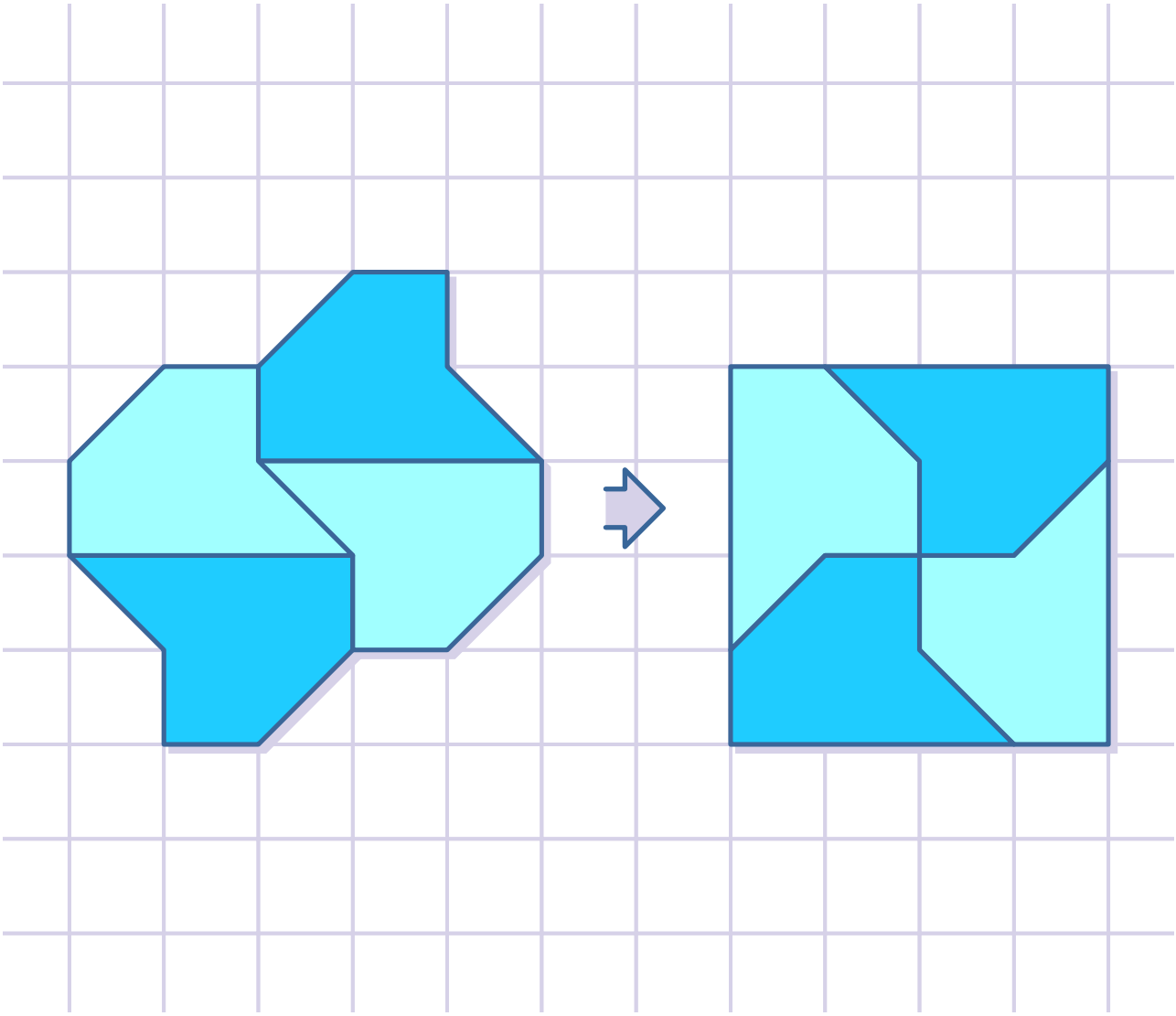
The Sedan Chair Puzzle (Solution)



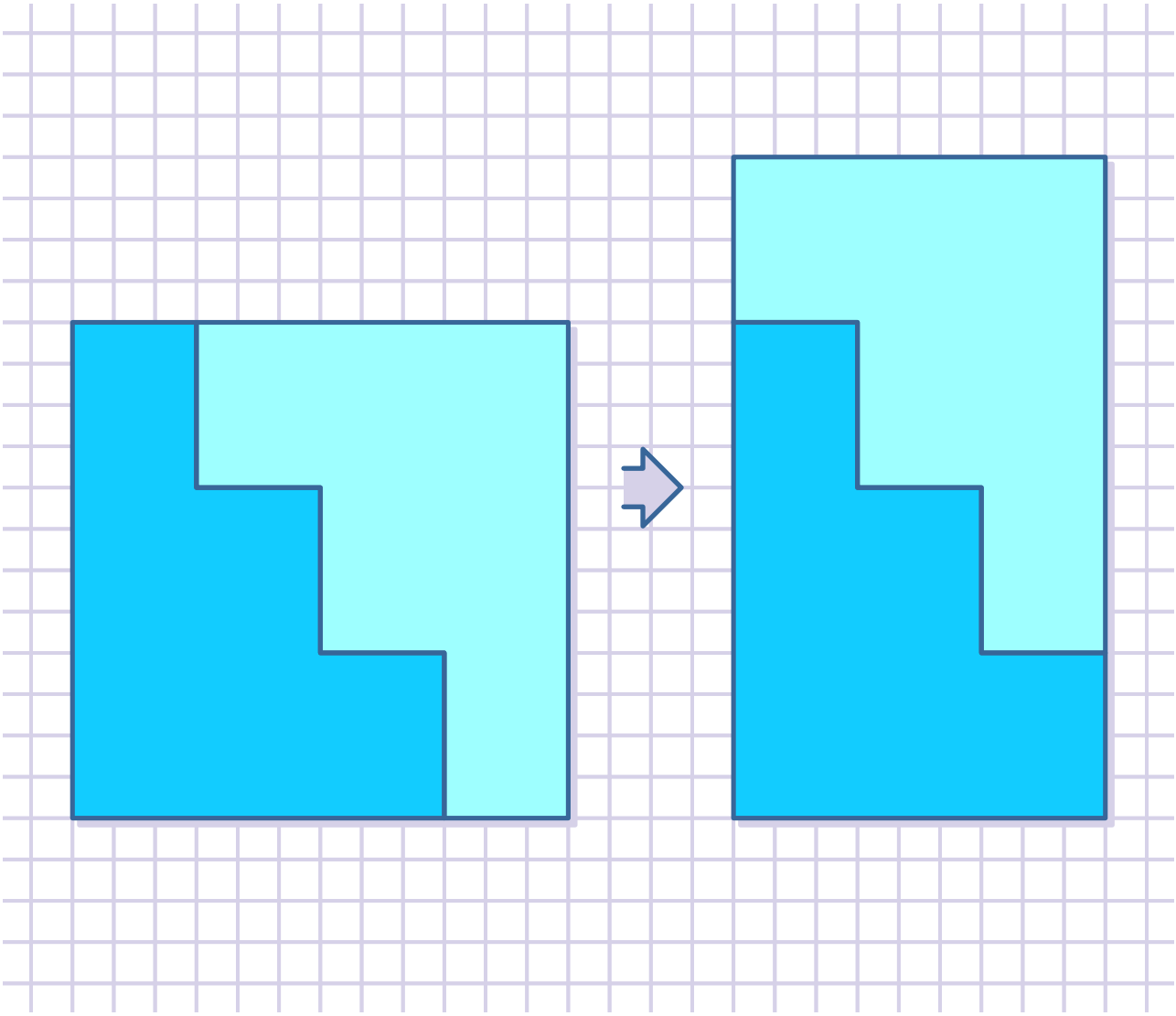
The minimum number of pieces required to solve this puzzle is two, and the solution itself is shown in the illustration.



The solution is shown in the illustration.



The illustration above shows how to divide the figure into four identical parts and then arrange them into a square.



The solution to this puzzle is shown in the illustration.

The solution is based on a dissection that uses the *step* technique, so named because of the resemblance to stair steps. Girolamo Cardano, an Italian physician and mathematician, described this dissection in 1663 in his *De Rerum Varietate.*

Greg N. Frederickson in his *Dissections: Plane & Fancy* writes: "...In its simplest form, the step technique cuts a rectangle in a zigzag pattern, alternating horizontal cuts of one length with vertical cuts of another. By shifting the two resulting pieces by one step relative to each other, we form a different rectangle..."