Quilt Mending: Math Circle

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Warm Up Activity

Solve the problems below. When you get an answer for a question, write your answer on the line at the bottom that has the question number below it.

1. You have 9 coins and 1 of them is fake. The real coins weigh more than the fake coins. Using a balance scale, what is the minimum number of weighing's that you would need to figure out which coin is the fake coin?

2. Courtney just made a delicious batch of chocolate chip cookies. If Igor ate half of the cookies, Preston ate ¼ of the cookies, and Joseph and Courtney both ate 1/8 of the cookies each, how many cookies are left?

3. How many sides does a Mobius strip have?

4. How many dwarves did Snow White meet?

| 2	0	1	7
Question 1 Answer	Question 2 Answer	Question 3 Answer	Question 4 Answer

Quilt Mending

Princess Fiona has damaged all her quilts during sword practice. Now they all have holes in them! Princess Fiona wants to fix them so that her "hole-y" quits are full quilts again. Cut each "hole-y" quilt into the fewest possible number of pieces to make the quilt on the right. Make sure to count the number of individual squares on the left and the right to make sure they match!

Example:

Quilt 1
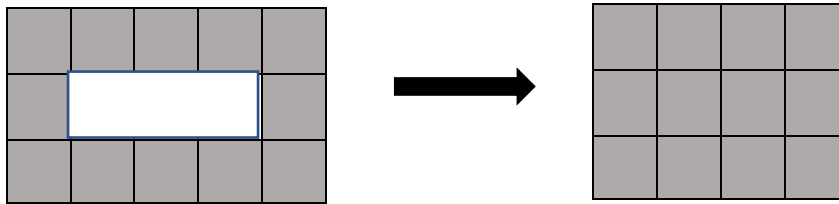
Count the number of squares before and after you complete.

For example, how many squares are in the quilt on the left?

12

How many squares are in the quilt on the right?

Do they match?

12   Yes

What is the fewest number of pieces that the princess must cut the "hole-y" quilt into on the left to make the full quilt on the right? How many individual squares were moved?
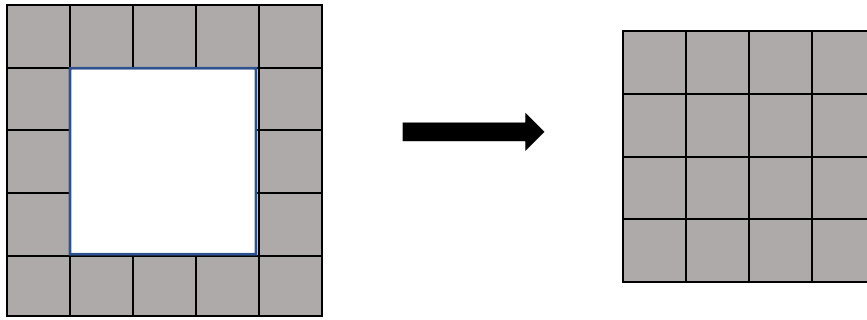
For this quilt. You can cut the "hole-y" quilt into two pieces like this.
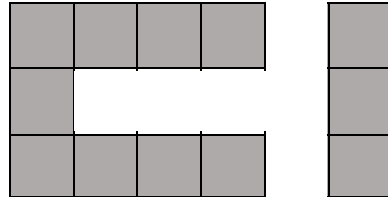
Then you can turn the skinny piece horizontally and put it in the middle hole to create the completed quilt on the right!
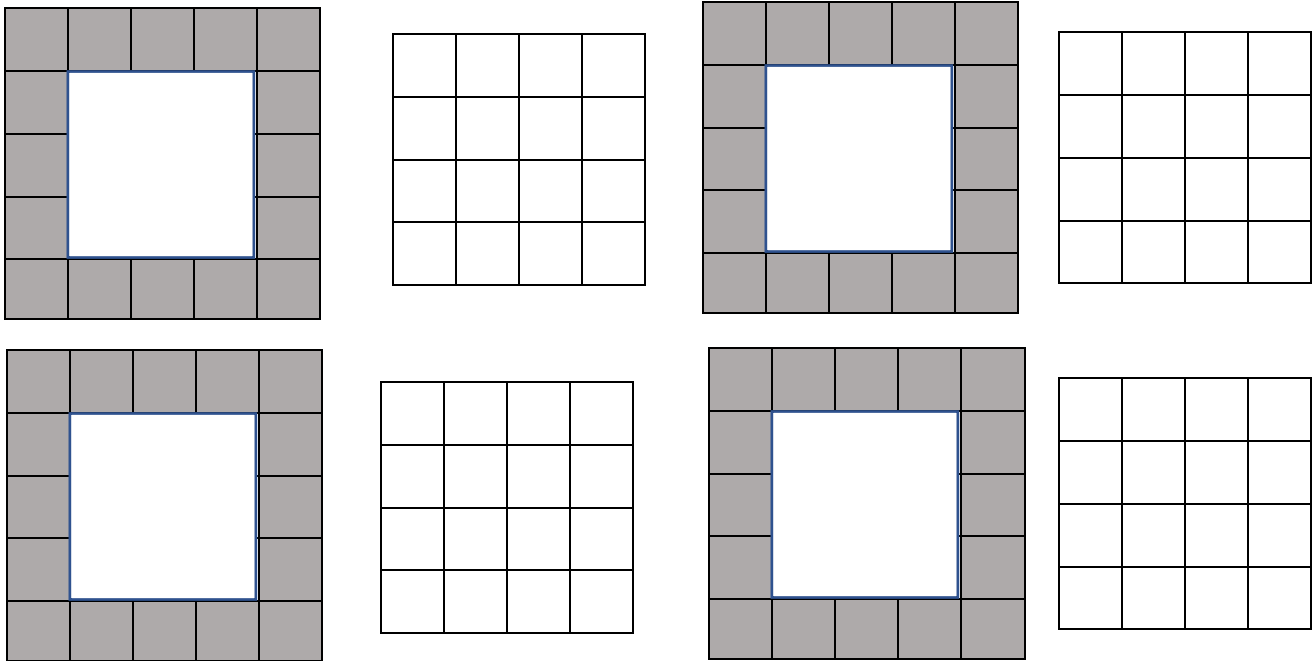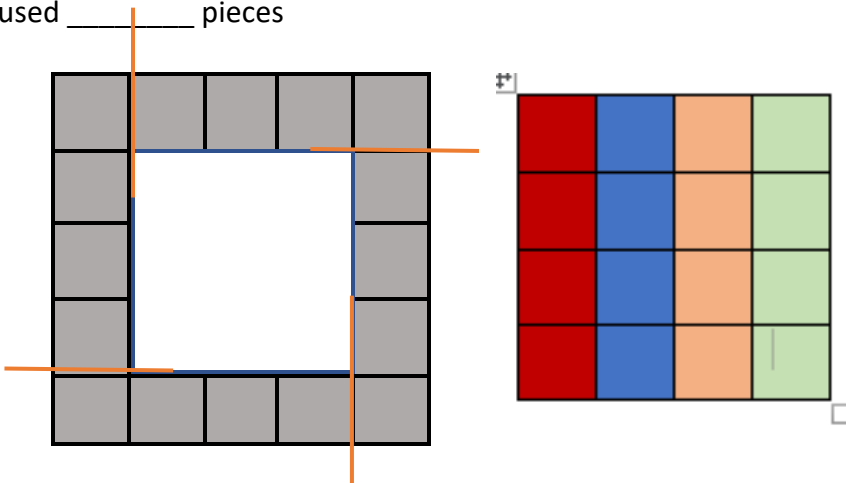
2 Pieces

1. Quilt 2

Cut the quilt on the left to make the quilt on the right. Use as few pieces as possible.

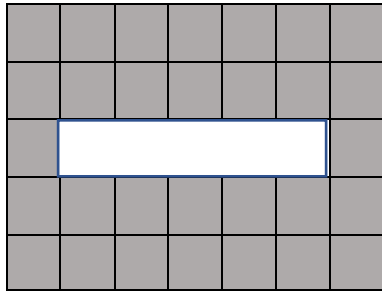Use these quilts below to experiment before showing your answer at the bottom of the page.

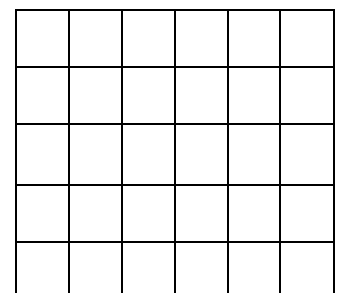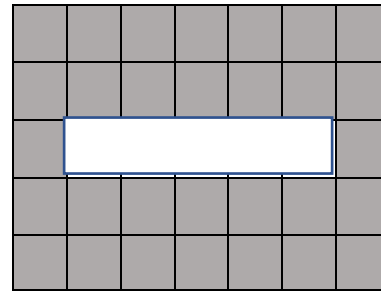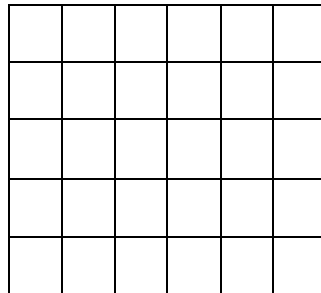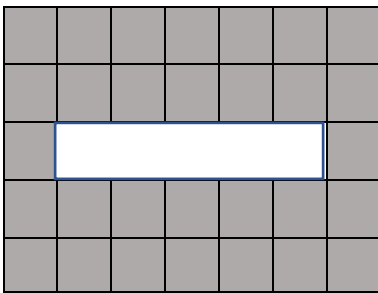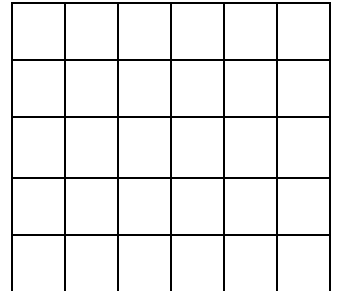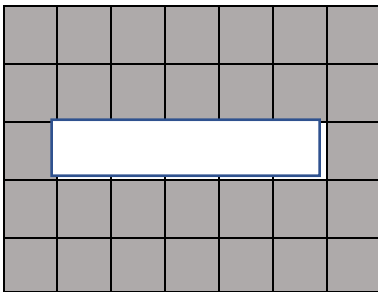Show your answer here:

I used _____ pieces

4
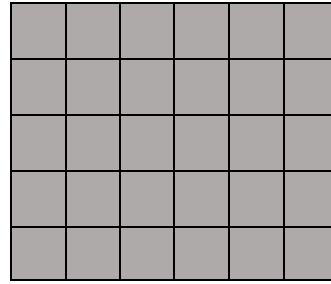
Cut the quilt on the left to make the quilt on the right. Use as few pieces as possible.
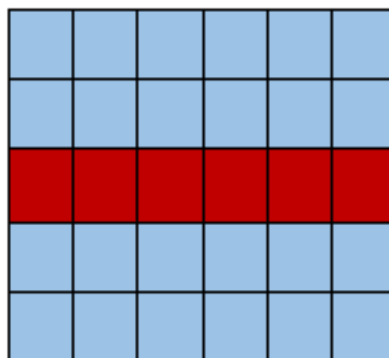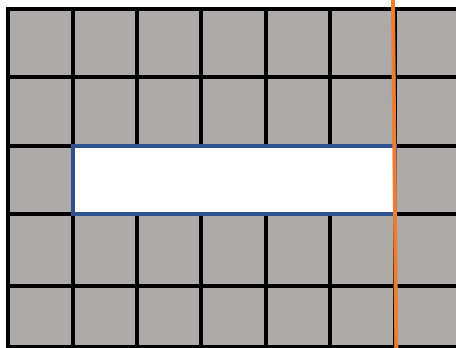
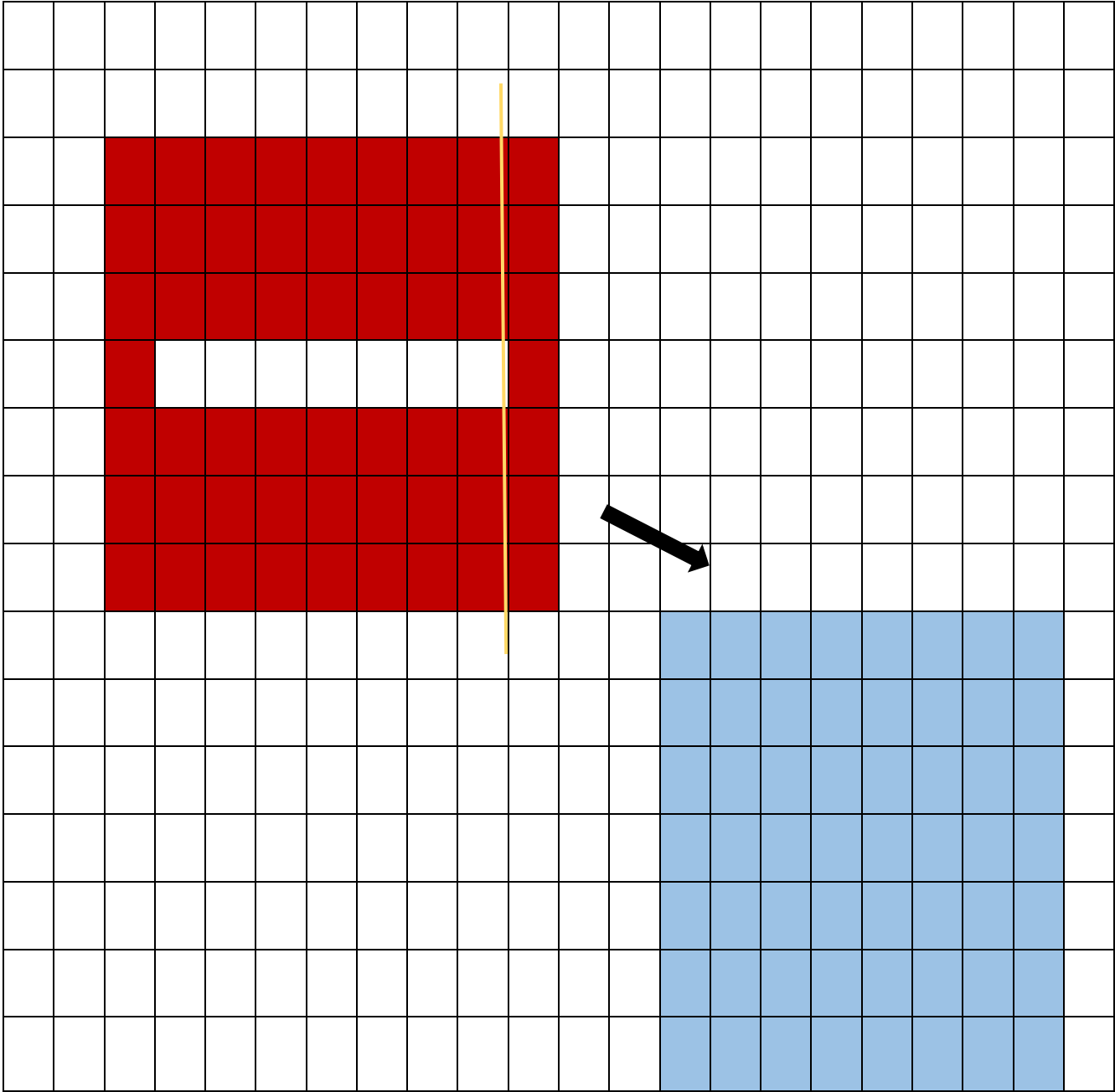Use these quilts below to experiment before showing your answer at the bottom of the page.
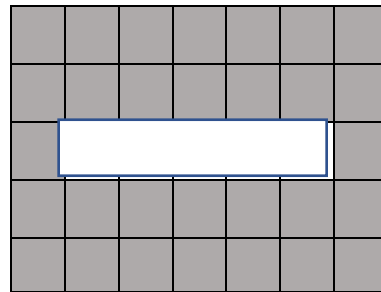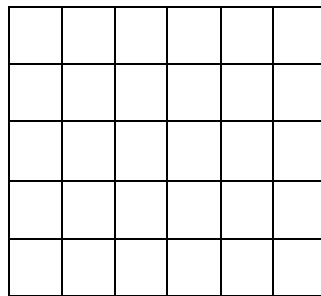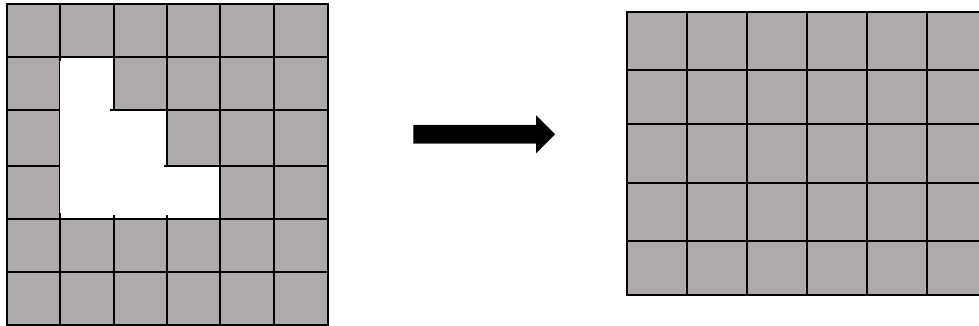
Show your answer here:

I used _____ pieces

2

Create your own quilt! Now it's your turn! First, make a quilt that has a hole in the middle just like the quilts you see above, such that, the hole has width one and can be cut into 2 pieces to be reassembled into a rectangular quilt. (See the example and problem #3) Then solve!
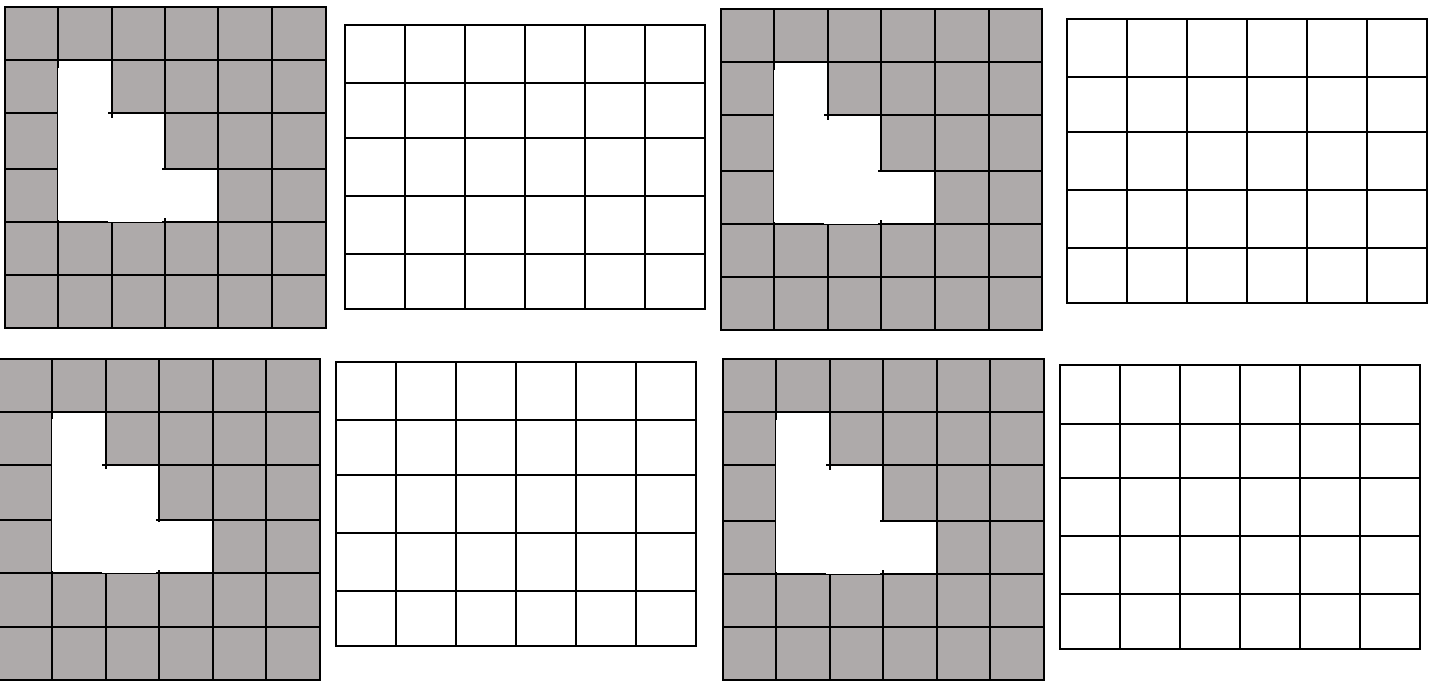
1. Quilt 4: Challenge Quilt

Cut the quilt on the left to make the quilt on the right. Use as few pieces as possible.

Use these quilts below to experiment before showing your answer at the bottom of the page.

Show your answer here:

I used _____ pieces

4

Lily says that she can cut this quilt into 6 pieces in order to get the quilt on the right. However, Mason says that he can cut this quilt into 4 pieces in order to get the quilt on the right. Who is right? How do we know Mason cut the quilt into the smallest amount of pieces possible?
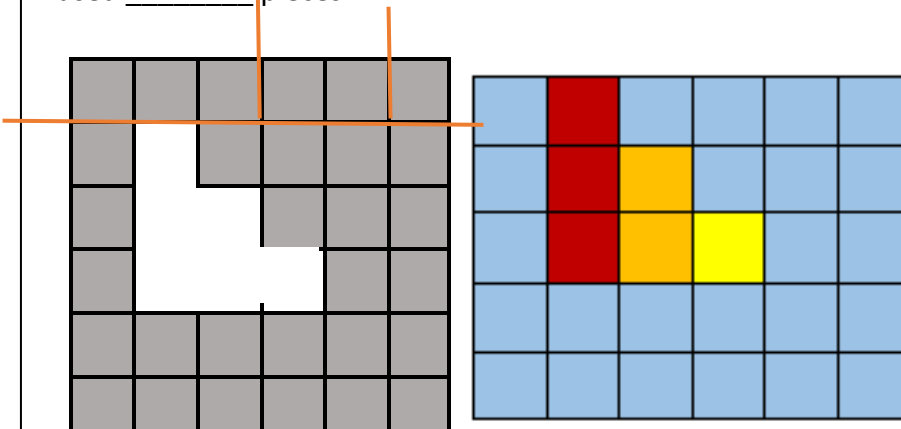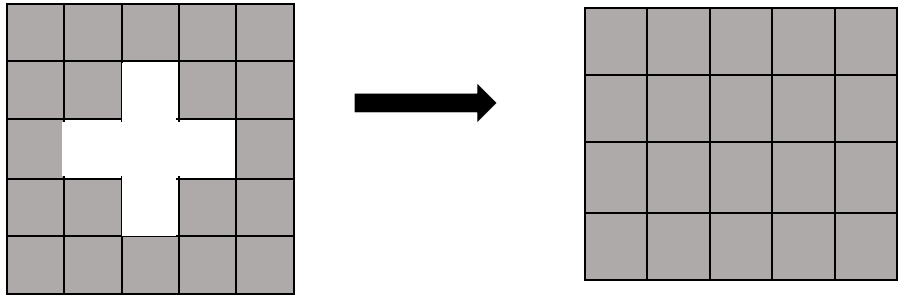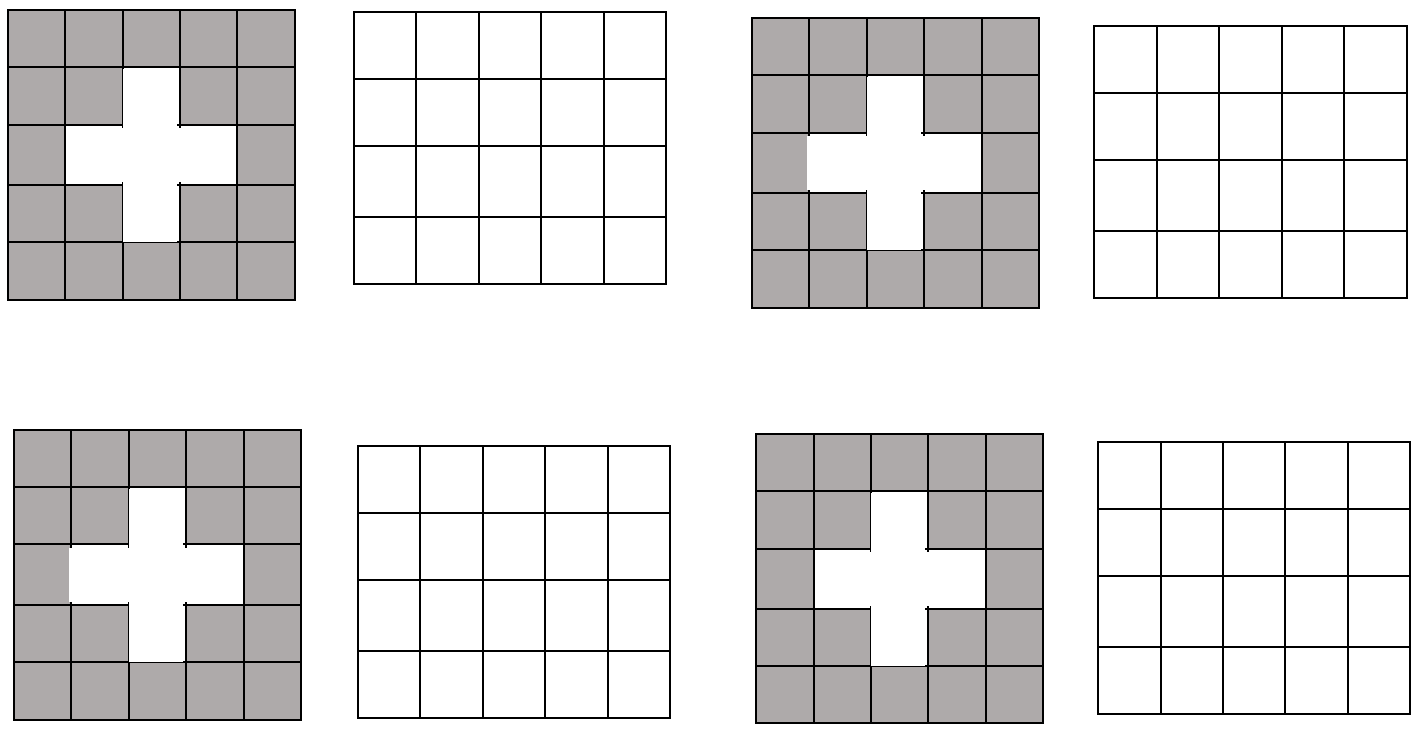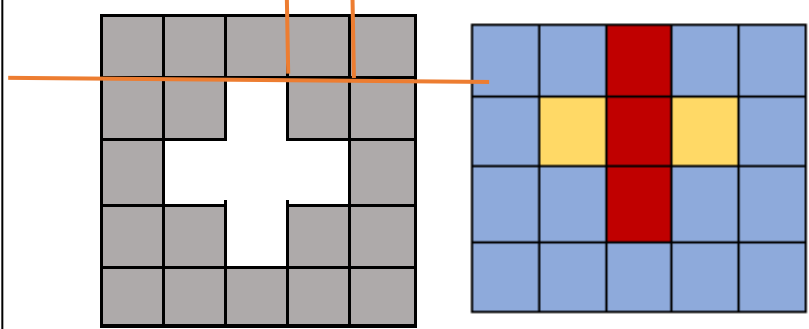
Cut the quilt on the left to make the quilt on the right. Use as few pieces as possible.

Use these quilts below to experiment before showing your answer at the bottom of the page.

Show your answer here:

I used _____ pieces

4

Extension Problem: 3D Box

Picture a building created by 1 unit cubes. This building has a length of 3, a width of 3, and a height of 3, but a tunnel made of 3 unit cubes goes through the middle of the building. (The middle part of the building is missing). How could you rearrange the building so that there was no longer a tunnel. What would be the length, width, and height of this building? How many pieces would you have to split the building into in order to rearrange the building so that it did not have any holes? Use the unit cubes to help you solve this problem!
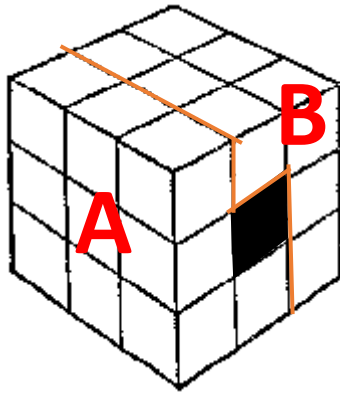
The answer will be a 2x3x4 rectangular prism.

You can break the building apart into 2 pieces demonstrated by the orange line above. After you split the building into the two pieces you can put section B slightly on top of section A to create the rectangular prism.