Square of Squares

1 Square of squares

1. Is it possible to divide a square into 4 smaller squares? 5 smaller squares? 10 smaller squares? What numbers can you achieve? The smaller squares do not all have to be the same size.

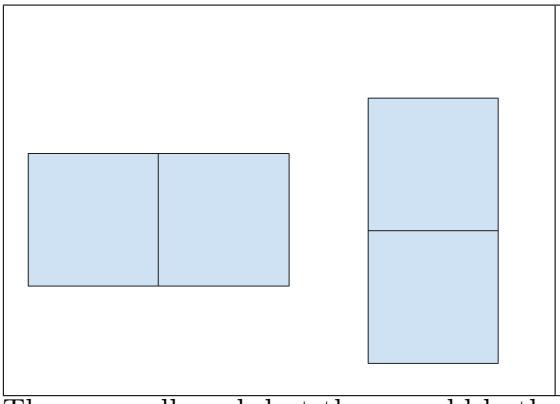
   The squares do not have to be the same size. A chart might help you keep track of your answers. Do you see any patterns? (HINT – if you get stuck on one number, move on to another number.)

Number of Squares	Possible?
1	Yes, with zero cuts!
2	
3	
4	
5	
6	
7	
8	
9	
10	

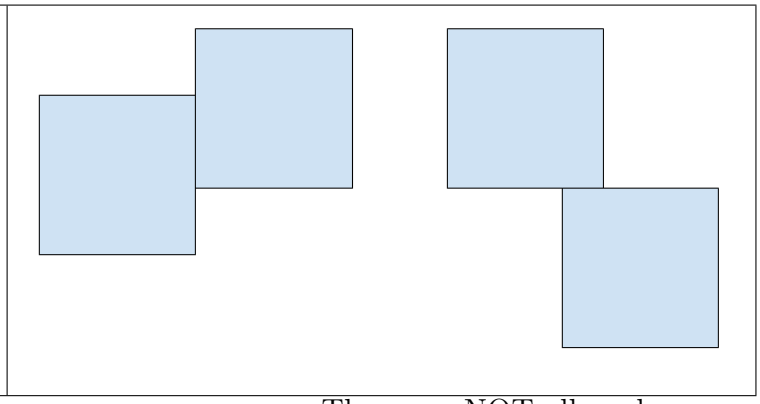
2. Cutting cubes: Into how many cubes can you cut a cube? Can you cut it into 15 cubes? 20? 25? What patterns do you find?

2 Dominos, triominos, tetrominos, and pentominos

Suppose we put together squares of the same size. Squares are allowed to touch each other along an entire edge but can't touch on just a partial edge.



These are allowed, but they would both be considered the same shape.



These are NOT allowed.

If we put together two squares of the same size, we get dominos, like the picture above to the left.

1. Consider 3 squares of the same size. Put them together so that each square is touching at least one other square along an entire edge. How many different shapes can you make? These shapes are called triominos.

2. Consider 4 squares of the same size. We want to create shapes with them in the same way. How many different shapes can you make? These shapes are called tetrominos.

3. What shapes can you make with 5 squares of the same size? These shapes are called pentominos.

3 Tiling with tetrominos

For each of these cases, show a way to cover the board or explain why it cannot be done.

(a) Can you tile a 20×1 board with all the tetrominos, using each one once?

(b) A 10x2?

(c) A 4x5?