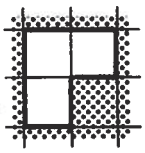
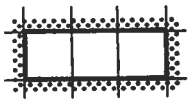
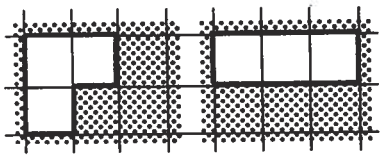
Envelopes

What is the smallest rectangle (or square) onto which you can fit the bent triomino? As you can see in this drawing, it is a 2-by-2 square.

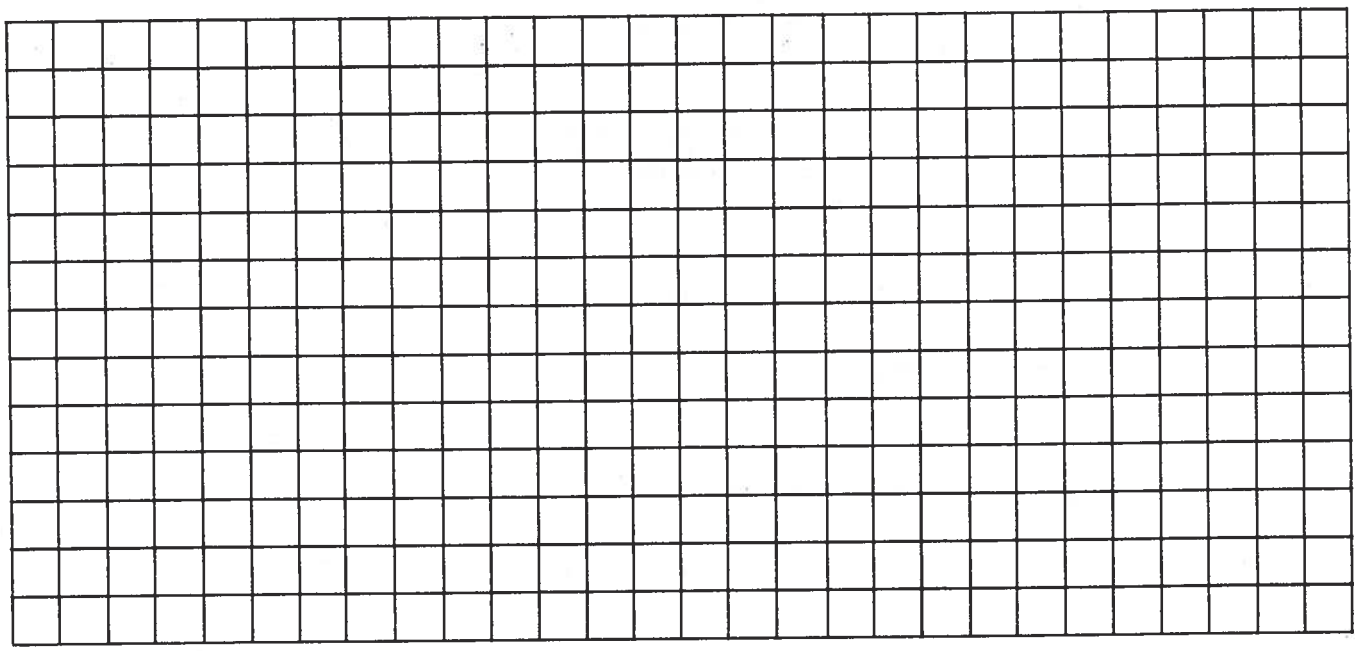


A 1-by-3 rectangle is the smallest rectangle onto which you can fit the straight triomino. The 1-by-3 and 2-by-2 rectangles are triomino *envelopes* because they are the smallest rectangles into which the triominoes will fit. The 2-by-3 rectangles are not triomino envelopes because they are too big.





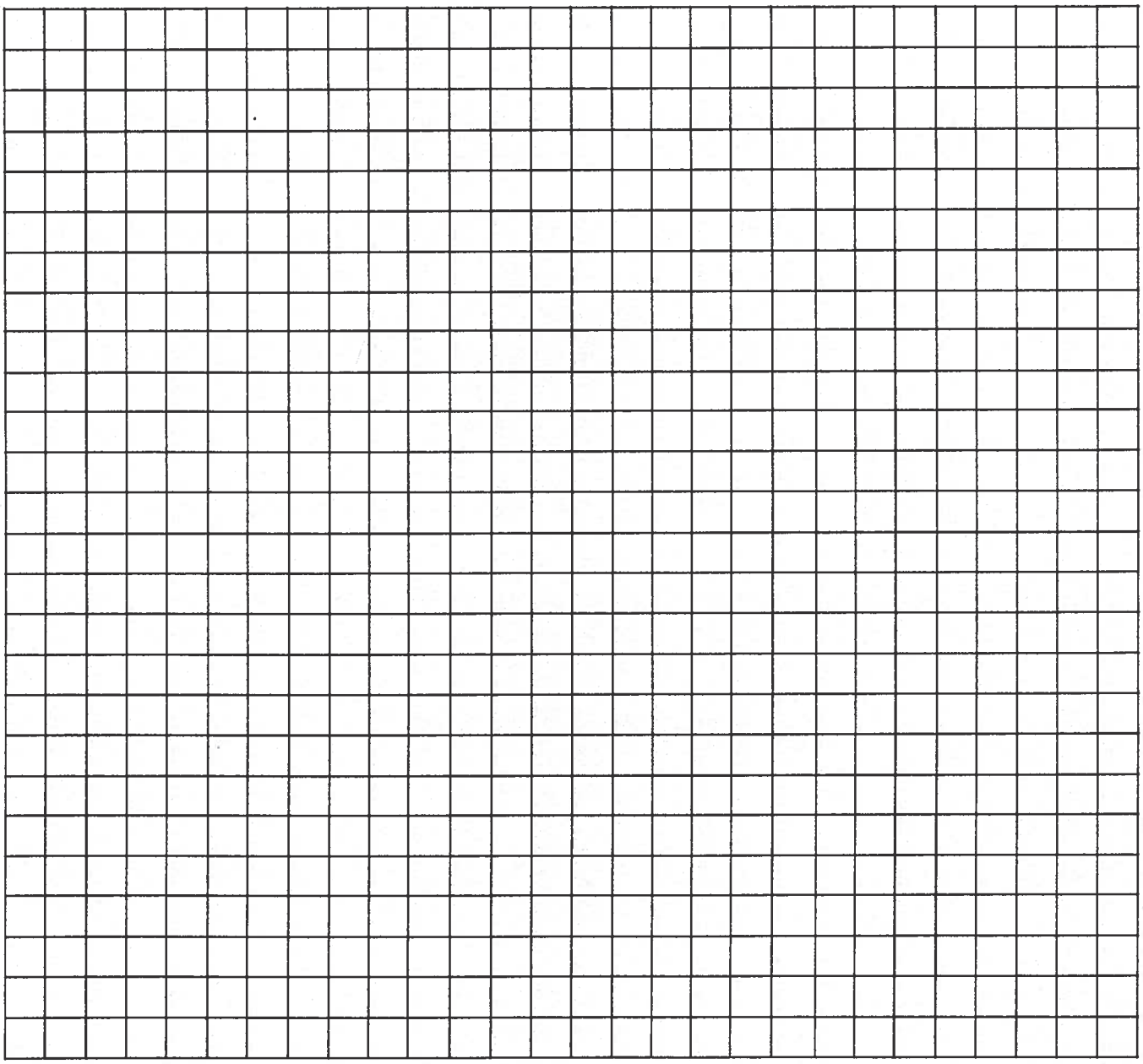
Find all the tetromino envelopes. Write their dimensions in the blanks below. Also write the names of the tetrominoes that belong in each envelope. The work has been started for you.



1. 1 by _____ Tetrominoes: i
2. _____ by _____ Tetrominoes: _____
3. _____ by _____ Tetrominoes: _____

Pentomino Envelopes

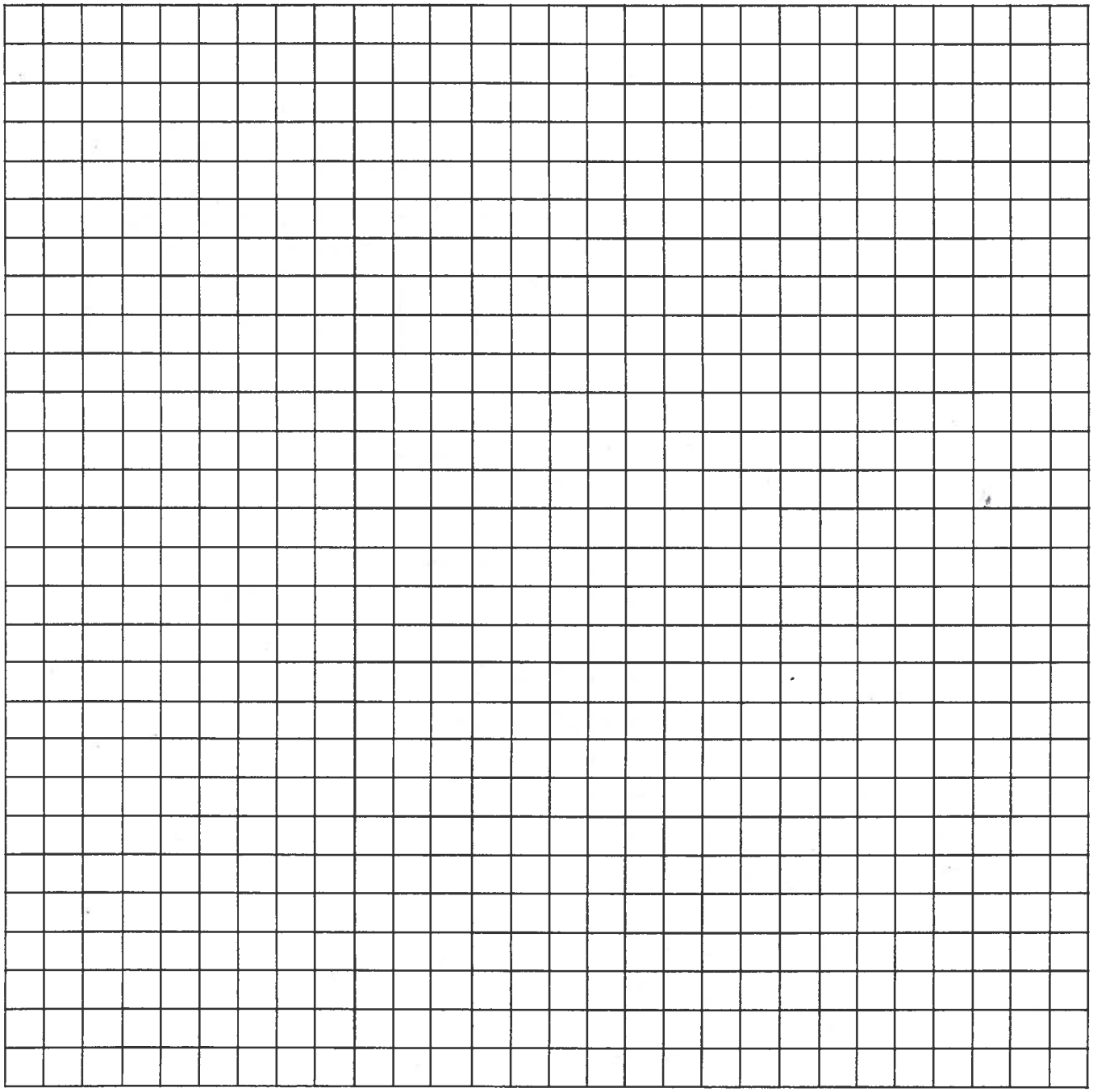
Find all the pentomino envelopes. Write their dimensions in the blanks below. Also write the names of the pentominoes that belong in each envelope.



1. _____ by _____ Pentominoes: _____
2. _____ by _____ Pentominoes: _____
3. _____ by _____ Pentominoes: _____
4. _____ by _____ Pentominoes: _____

Hexominoes

Use this grid to find as many hexominoes as you can. Make sure you do not show the same one twice.



How many hexominoes do you think there are? _____
You probably found a great many. Are you sure you found them all? Are you sure you have no duplicates?

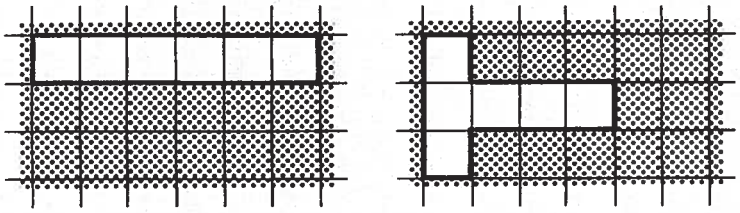
Hexomino Envelopes

Here is a list of rectangles.

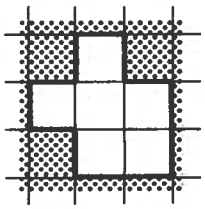
2 by 2	1 by 5	2 by 3	2 by 5
3 by 3	3 by 5	2 by 4	1 by 6
3 by 4	2 by 6	4 by 4	3 by 6

Some of these rectangles are too small to be hexomino envelopes. The 2-by-2 rectangle is made of only 4 small squares and is not one. Cross out the rectangles that are too small to be hexomino envelopes.

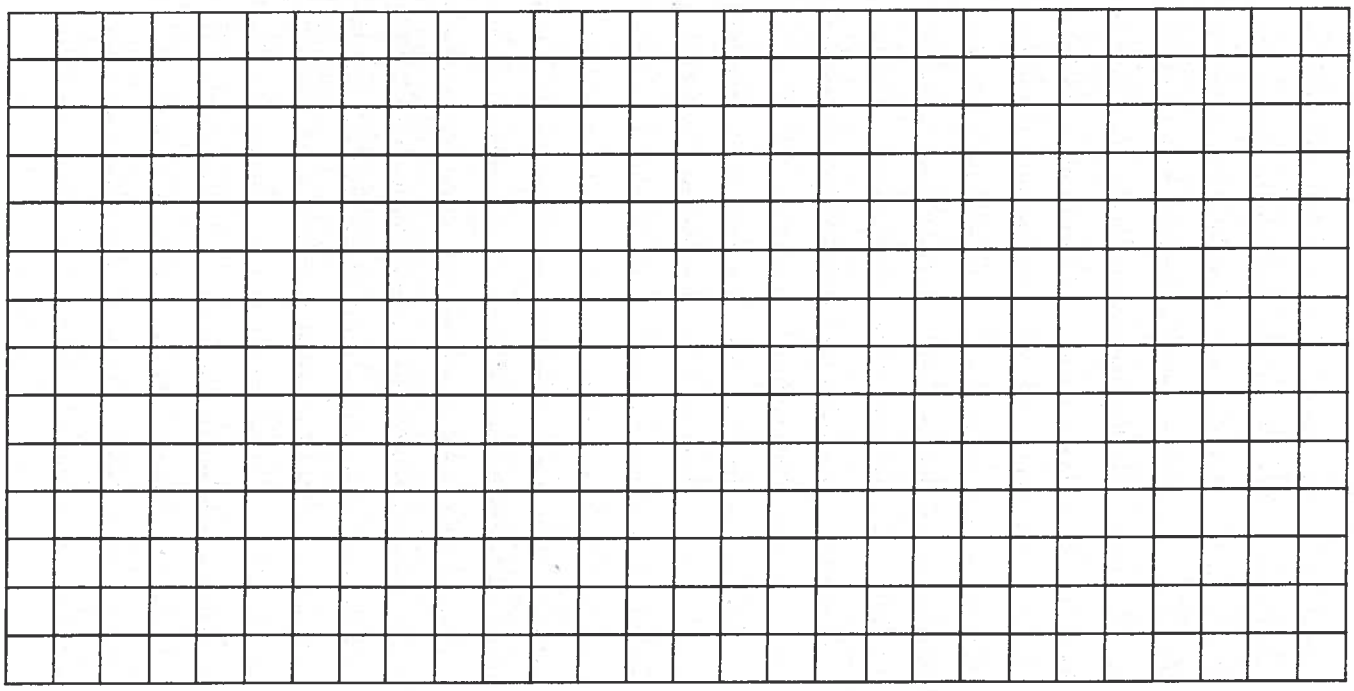
Some of the rectangles are too big to be hexomino envelopes. For example, the 3-by-6 rectangle is too big.



However, the 3-by-3 rectangle is a hexomino envelope.

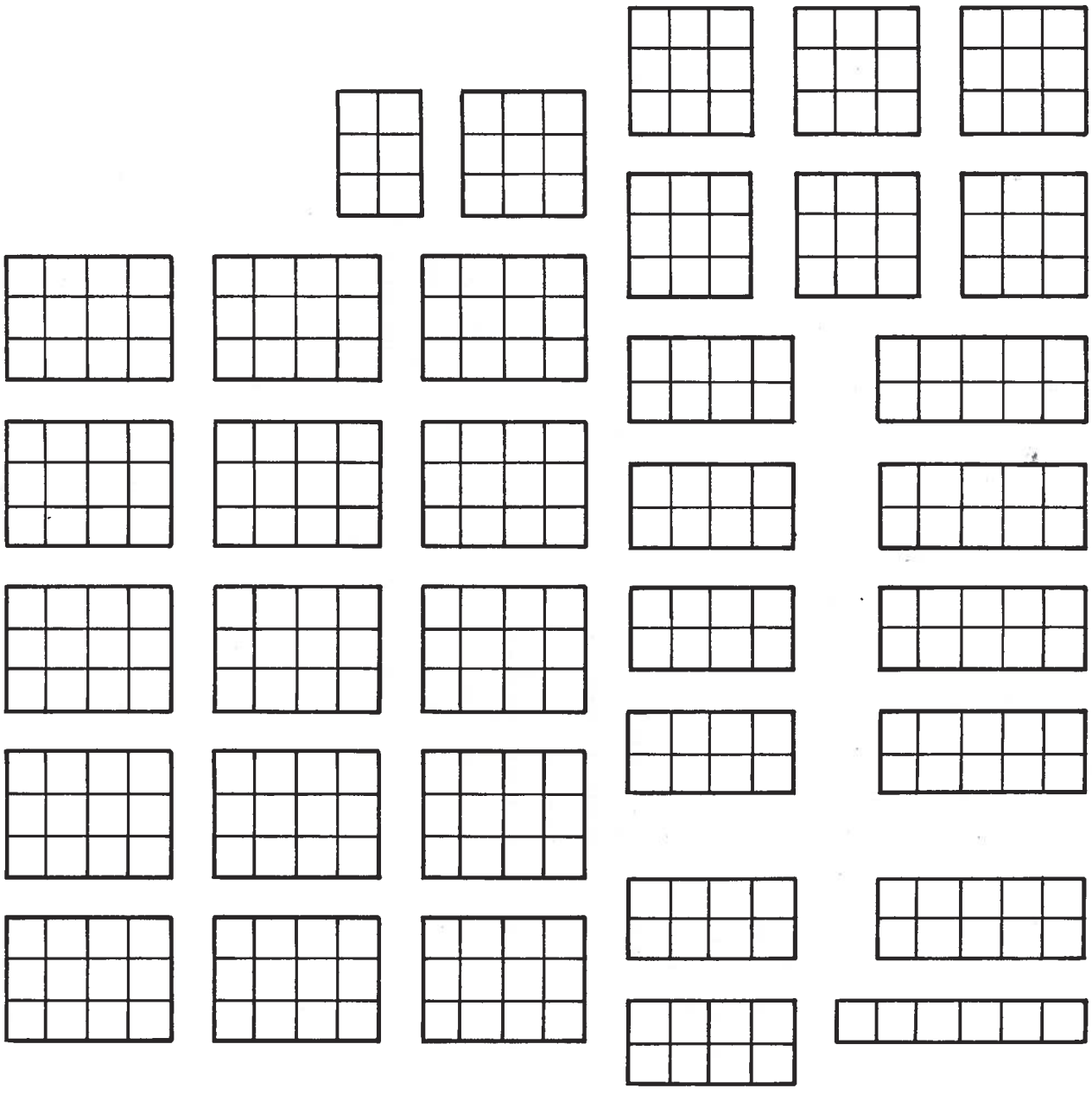


Circle all the hexomino envelopes on the list above. Cross out all the rest. Use the grid below to experiment. ★



Classifying the Hexominoes

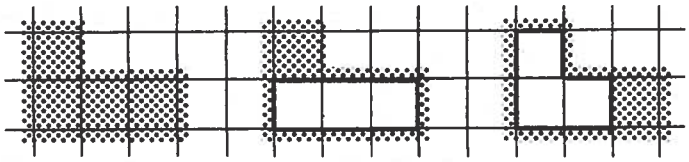
There are 35 hexominoes. Is that the number you found? Organize them by drawing them in the envelopes below. As you work, watch out for duplicates. There should be no empty envelopes when you finish.



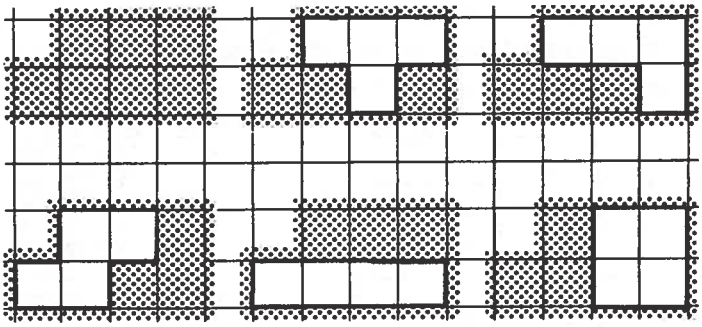
If you cut out paper hexominoes, which ones could you fold into a cube? Mark them with checks above. ★

Minimum Covers

This is the smallest space onto which you can fit either triomino. Its area is 4 square units.



All the tetrominoes fit on this space. Area: 7 square units



1. Find a smaller area on which any of the tetrominoes will fit. Experiment on the grid below. Area:_____
2. What is the smallest area onto which you can fit any pentomino? Experiment below. Area:_____
3. What is the smallest area onto which you can fit any hexomino? Experiment below. Area:_____