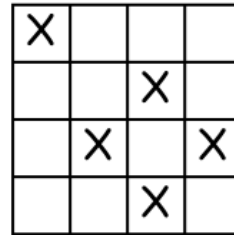
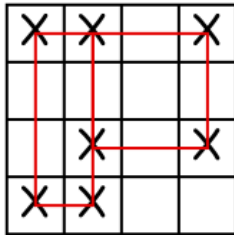


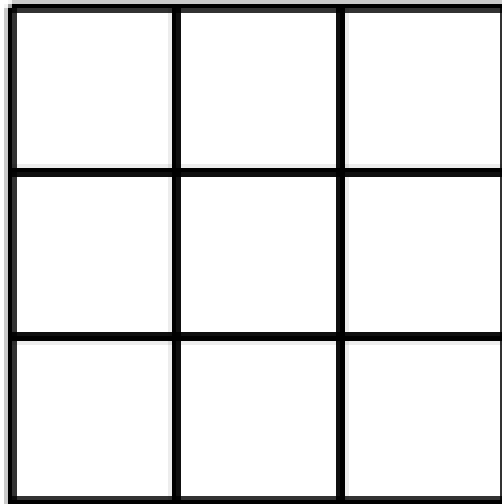
Puzzle of the Week

Avoiding Rectangles – 1

The X's in a grid can become the corners of rectangles with horizontal and vertical sides. The X's in this first grid form two rectangles. However, the goal is to avoid creating rectangles. The X's in the second grid are placed to avoid forming any rectangles.



THE CHALLENGE: Place as many X's as you can in this 3 by 3 grid and avoid creating any rectangles.



EXPLORATION: Look at other rectangular grids with 1, 2, or 3 rows. Do you see any patterns in your answers?

Puzzle of the Week

Avoiding Rectangles – 1 – Notes

THE CHALLENGE & EXPLORATION: Suppose the grid has m rows and n columns. The easiest first approach is to put n X's in the top row and m X's in the leftmost column. This will give you $(m + n - 1)$ X's, and it does not produce any rectangles.

This approach does give the best answer when there are 1 or 2 rows (or columns).

Here is the best answer for a 3 by 3 grid. It has 6 X's. In terms of m and n , this has $m + n$ X's.

X		X
X	X	
	X	X

If we want to extend this to 3 by n grids, we can simply put a single X in each new column. For grids with 3 rows, we will have $3 + n$ X's.

We will explore this further in Avoiding Rectangles - 2.