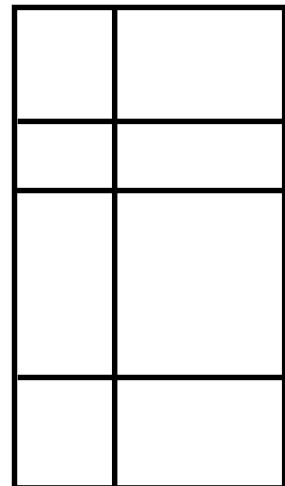
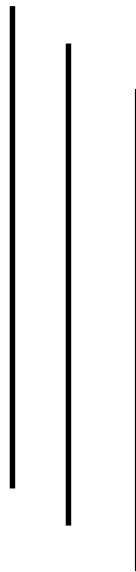
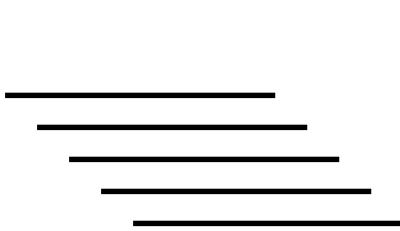




INVESTIGATION



Lines and rectangles



MathSphere

Lines and rectangles Investigation

Starter

What is the least number of lines you need to draw to make a rectangle?

Rules: all lines must be straight and they must be horizontal or vertical.

(horizontal



vertical)

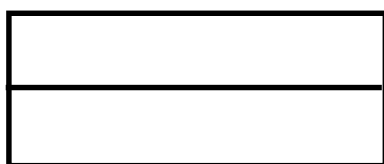


Well, it looks like 4 to me.
I mean, a rectangle is a four
sided shape isn't it!



The real question is:

How many rectangles can you draw using 5 straight lines?



Only count rectangles with
no other lines inside them.

eg this is 2 rectangles, not 3.

Some Ideas

Remember, you can only use vertical and horizontal lines.

Work in a methodical way, recording your results carefully as you go.

Think about how to set out your results clearly.

Try to find as many rules and patterns as you can.

Can you be sure that you have got all the possible solutions?

How many rectangles can you draw using 6 lines?

What would happen if you used 7, 8 or 9 lines?

Lines	Rectangles
4	1
5	
6	
7	

Can you see a pattern?

What would happen if you drew a different shape, such as a triangle?

Answer Guide

A simple starting point, but this investigation can get quite tricky.

The way to get the most number of rectangles is to have an equal number of horizontal and vertical lines, but, of course this is impossible when using an odd number of lines.

A table of results:

Lines	Rectangles
4	1
5	2
6	4
7	6
8	9
9	12
10	16

There are a number of patterns which emerge from this table of results.

Children need to look at the differences as the number of rectangles goes up:

Rectangles	Difference
1	
2	1
4	2
6	2
9	3
12	3
16	4

Can they predict?

Can they see the square numbers for the even number of lines?