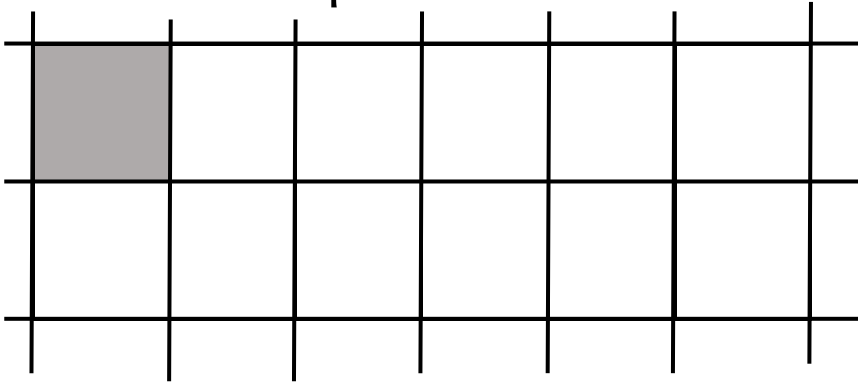
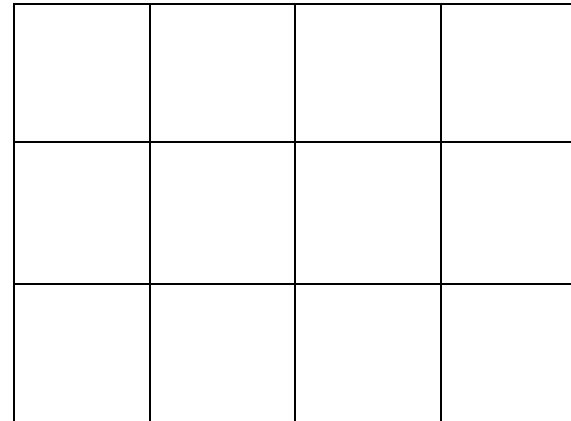


## Lines and Squares



Above are 10 straight lines (3 horizontal lines and 7 vertical lines) and 17 squares.



Above are 9 lines (4 horizontal lines and 5 vertical lines) and 20 squares.

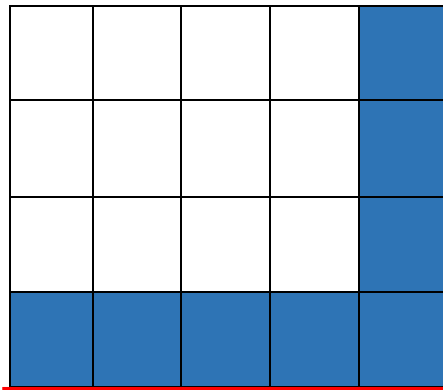
a) Find the smallest number of lines needed to make exactly 100 squares.

The shape is to be either a square or a rectangle. Compound shapes not allowed.

*Hint: This is a problem to challenge your 'trial and error' skills. Keeping a record and organizing your attempts is a good way not to repeat tries and waste time.*

Answer:

Look at the 4 x 3 rectangle ....



If I add one horizontal line and one vertical line I add:

8 (1 x 1) squares

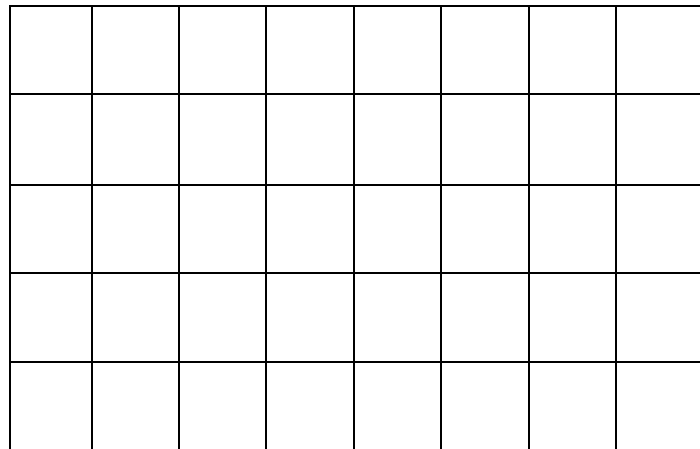
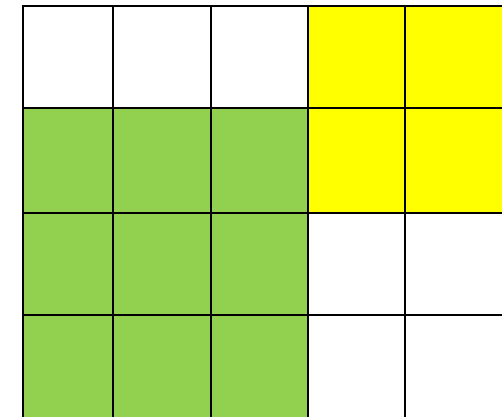
6 (2 X 2) squares

4 (3 x 3) squares

2 (4 x 4) squares

Total:  $20 + 8 + 6 + 4 + 2 = 40$  squares

*This is not enough so I add more lines*



Final answer:

In an 8 x 5 rectangle (or 5 x 8 rectangle) I use 15 lines.

I have:

40 (1 x 1) squares

28 (2 x 2) squares

18 (3 x 3) squares

10 (4 x 4) squares

4 (5 x 5) squares

Total 100 squares

This is the least number of lines I can use to make 100 squares.