

28) What is the maximum number of points of intersection for 12 lines?

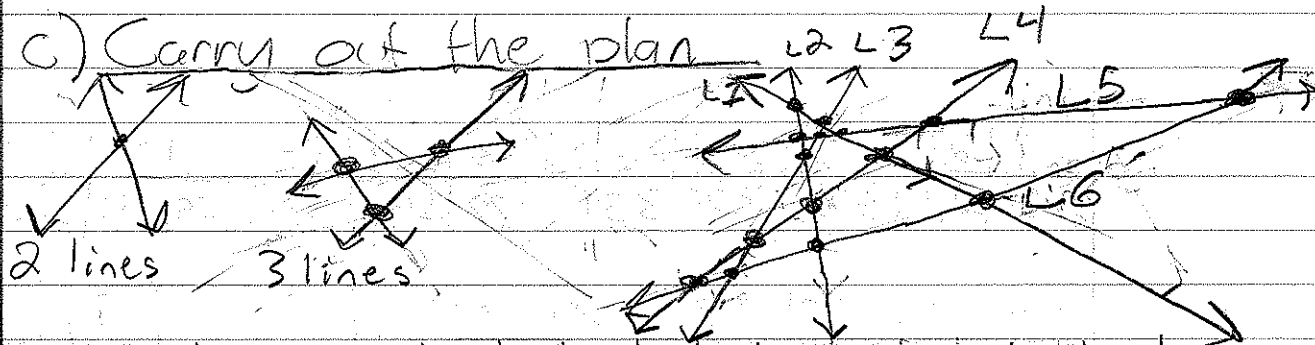
a) Understand the problem

1. The problem is asking the maximum number of points of intersection for 12 lines.
2. I need to find the number of points.

b) Devise A Plan

1. I will try a few cases with a smaller amount of lines to try and find a pattern.
2. I will then make a table and find the pattern which should give me the number of points for 12 lines.

c) Carry out the plan



No. of lines	2	3	4	5	6	7	8	9	10	11	12
No. of intersections	1	3	6	10	15	21	28	36	45	55	66

The maximum number of points of intersection for 12 lines is 66 according to the pattern.

## d) Looking back

1. I have answered the question by making a table and finding a pattern.
2. I wonder if I can use the pattern to determine the maximum number of points of intersection for 50 lines

No of lines	2	3	4	5	6	7	8	9
No of intersections	1	3	6	10	15	21	28	36

10	11	12	13	14	15	16	17	18	19	20	21	22
45	55	66	78	91	105	120	136	153	171	190	210	231

23	24	25	26	27	28	29	30	31	32	33
253	276	300	325	351	378	406	435	465	496	528

34	35	36	37	38	39	40	41	42	43	44
561	595	630	666	703	741	780	820	861	903	946

45	46	47	48	49	50
990	1035	1081	1128	1176	1225

So by using the pattern the maximum number of points of intersection for 50 lines is 1,225. Another way to find the number of intersections for  $n$  lines is to find the number of lines for each line.

28)

d) Looking back continued

Another way to find the number of intersections for a certain amount of lines is to take the number of lines for which you want to find the number of intersections for, say 50. For instance, and the number that comes before 50 (49) and multiply the two together and then divide by 2.

Example:

No of lines	4	10	50
No of intersections	6	45	1225

$$4 \times 3 = \frac{12}{2} = 6$$

$$10 \times 9 = \frac{90}{2} = 45$$

$$50 \times 49 = \frac{2450}{2} = 1225$$