Magdalene Ericsed

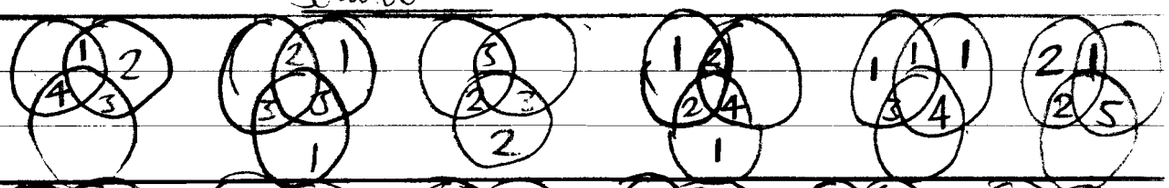
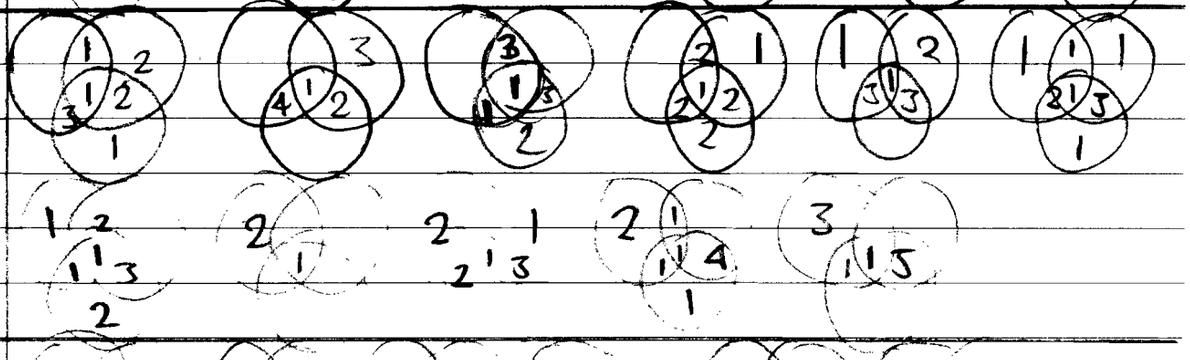
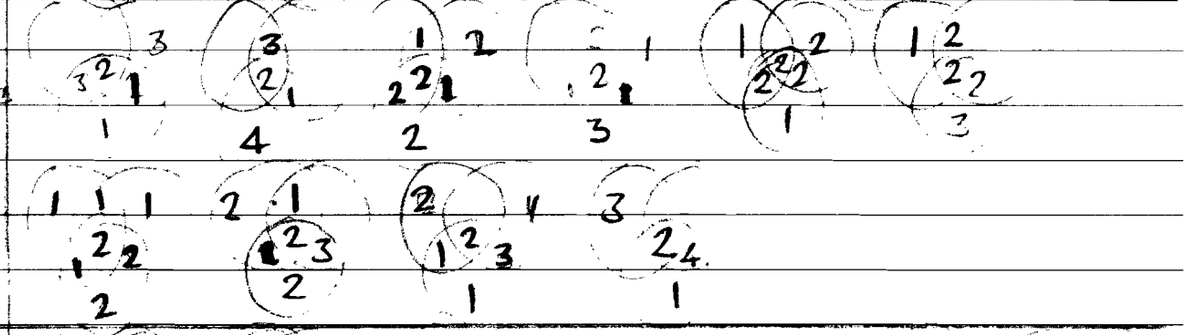
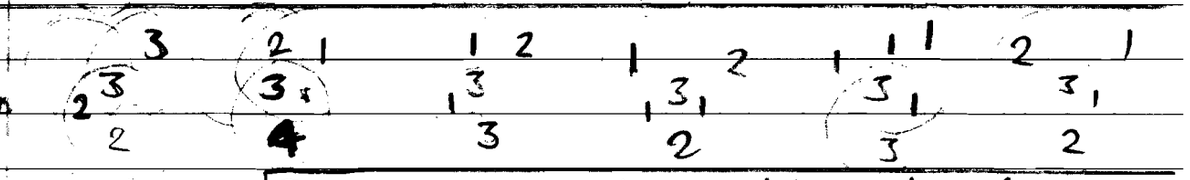
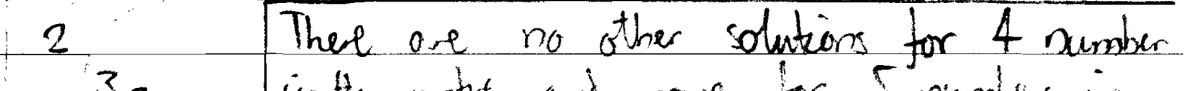
# Plants

11/10/10

I started by trying to find a formula to work out every option systematically but failed.

So I then tried to find the other solutions in a systematic trial and error. I began with a certain number of plants in the middle & then, since the smallest amount in one circle was 5, tried different versions in that circle before filling out the rest.

These are the solutions I found:

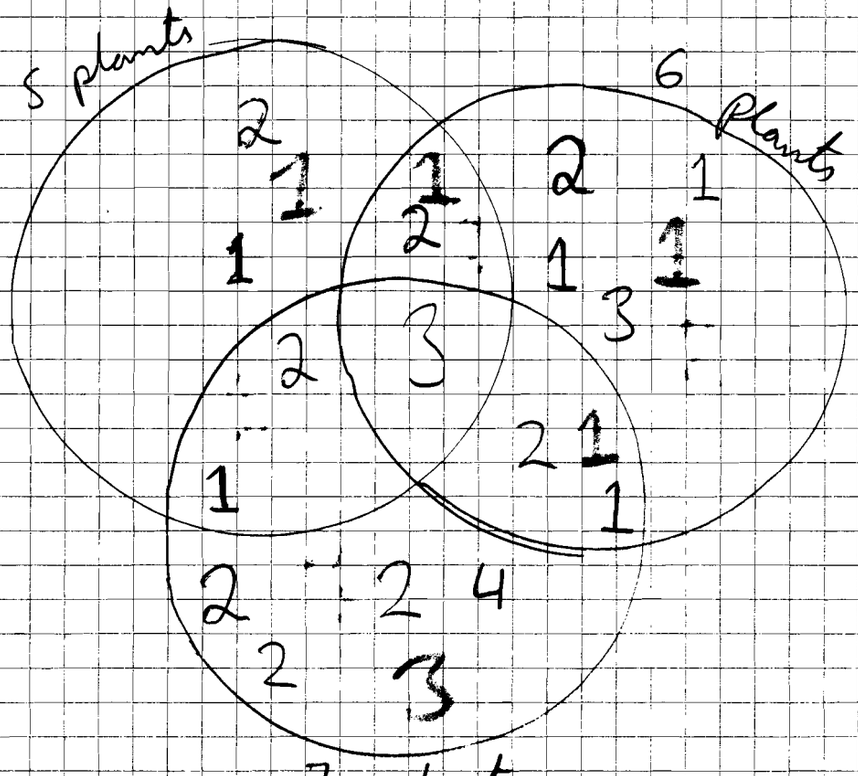
| Number in middle | Solutions |
|---|---|
| 0 – 6 solutions |  |
| 1 – 11 solutions |  |
| 2 – 10 solutions |  |
| 3 – 7 solutions |  |
| 4 |  |

There are no other solutions for 4 number in the centre and none for 5 numbers in the centre

Misha
Pg 1

# 10 Plant Problem

5 plants in middle : 0 solutions
4 plants in middle : 1 solution




3 plants in middle : 6 solutions
In this case A was 6 because there were 6 different ways to arrange 2 plants in sectors which overlapped between 2 circles. I got 2 plants from 5 + 6 + 7 = 18 plants if I seperate 18 - the middle three times for 3 circles so 18 - 3x3 = 9 And then 10 - the middle = 10 - 3 = 7 so I have 7 plants to fill 9 so 9 - 7 = 2 so I need to use 2 plants twice so 2+2 : 4 7-2 = 5 5+4 = 9 so it fills the gap

Misha pg 2

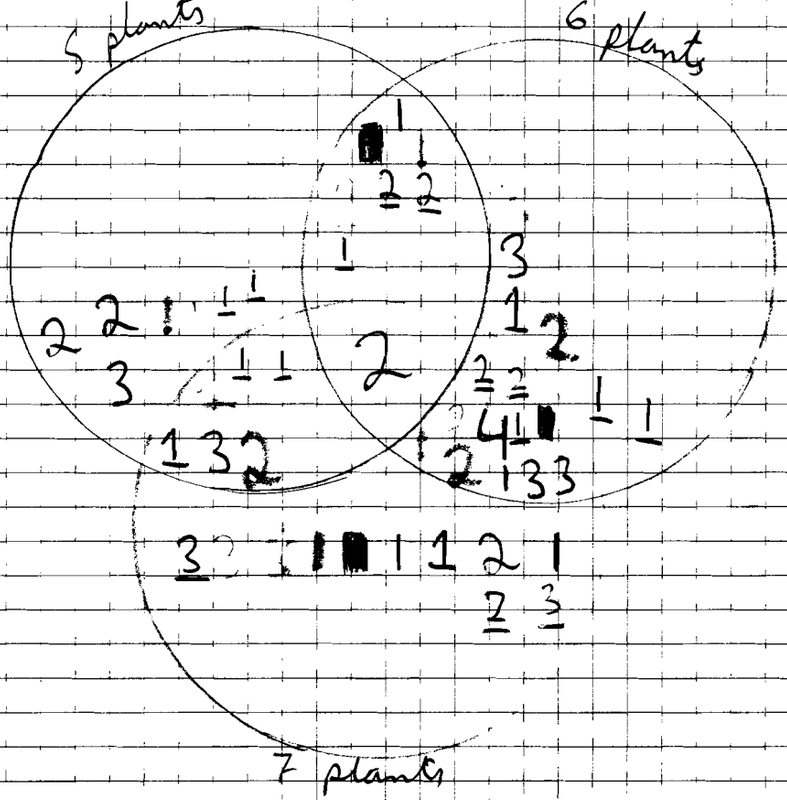
2 plants in middle:

18 - 2×3 = 12

10 - 2 = 8

12 - 8 = 4

so I need to use 4 plants twice



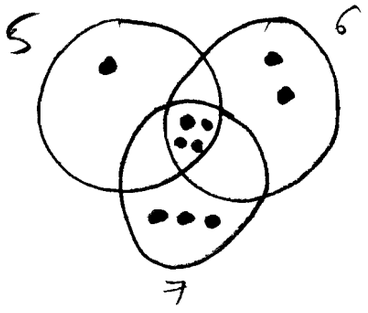

2 plants in middle: 11 solutions

Jack

# 'Planting Plants'.

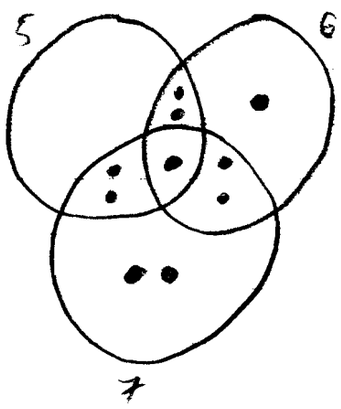
If we only use the three circles on their own, and the space shared by all 3 circles, we can plant this arrangement.

Eg(1)




But if we also use the areas shared by 2 circles, we can create more like this

Eg(2).

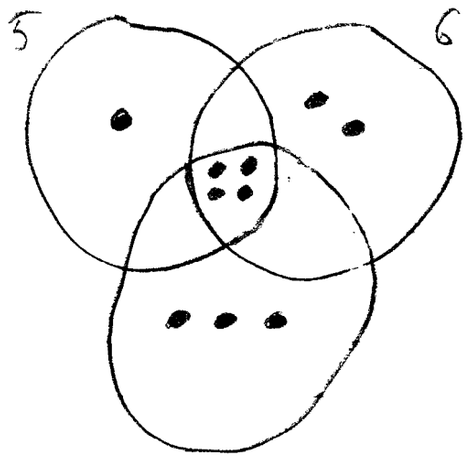



A way to see if an arrangement will work is by looking at how many plants are being shared how many times. As we have 10 plants, for (5+6+7) = 18 years, the plants must be shared 8 times, as 10+8=18.
In eg(1), 4 plants are in the middle, so as well as the one circle they are sitting, they are sitting 8 other spaces in the two other circles (4×2=8)

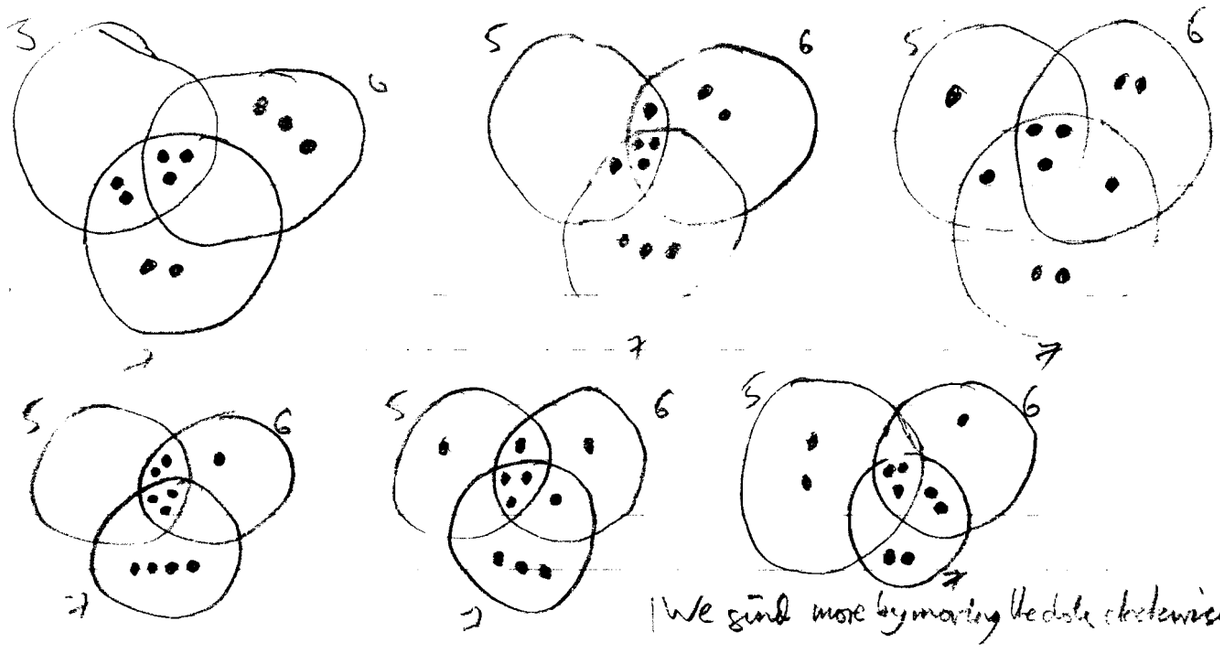
Jacob

We can call the number of times a plant is being used in other circles 's' (for shared')
In total, s must equal 8 (s=8)
If a plant is in the central section, in 3 circles, it's s=2
If a plant is in the sections shared by 2 circles, its s=1

We can start with this arrangement:



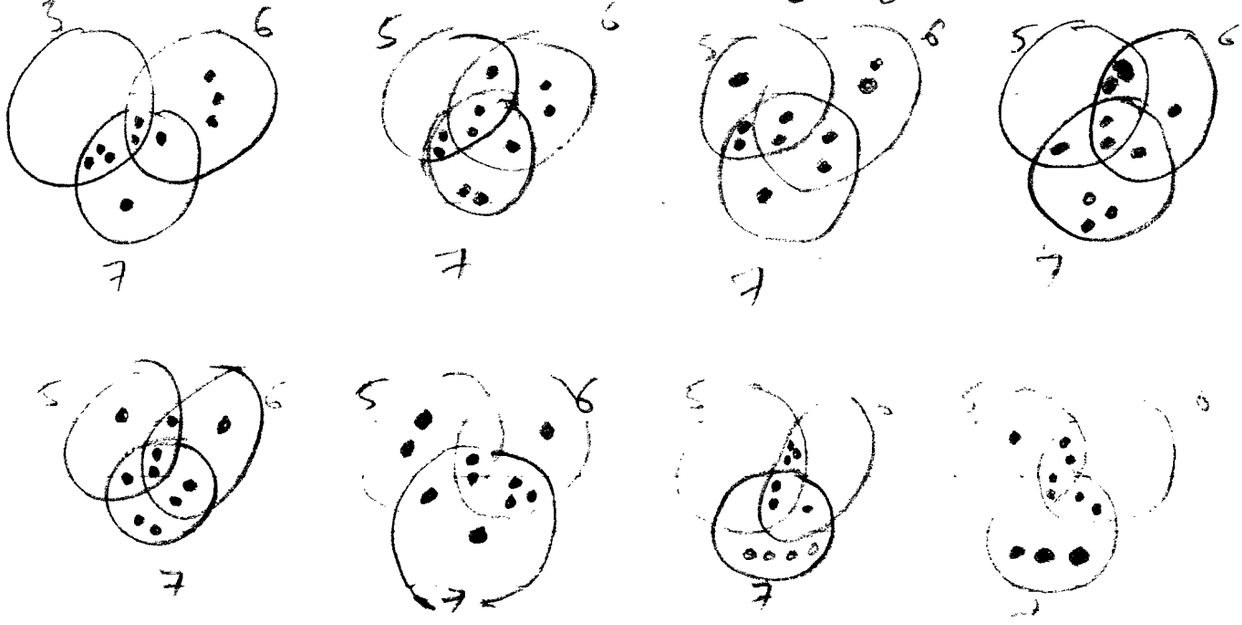

Then we can take an 's' value of 1 (equals 1 in the center) from the center, and distribute it in different ways around the diagram like this:




We could more by moving the dots clockwise

Sarah

We can then take an 's' value of 4 from the center:



Mistake pg 5

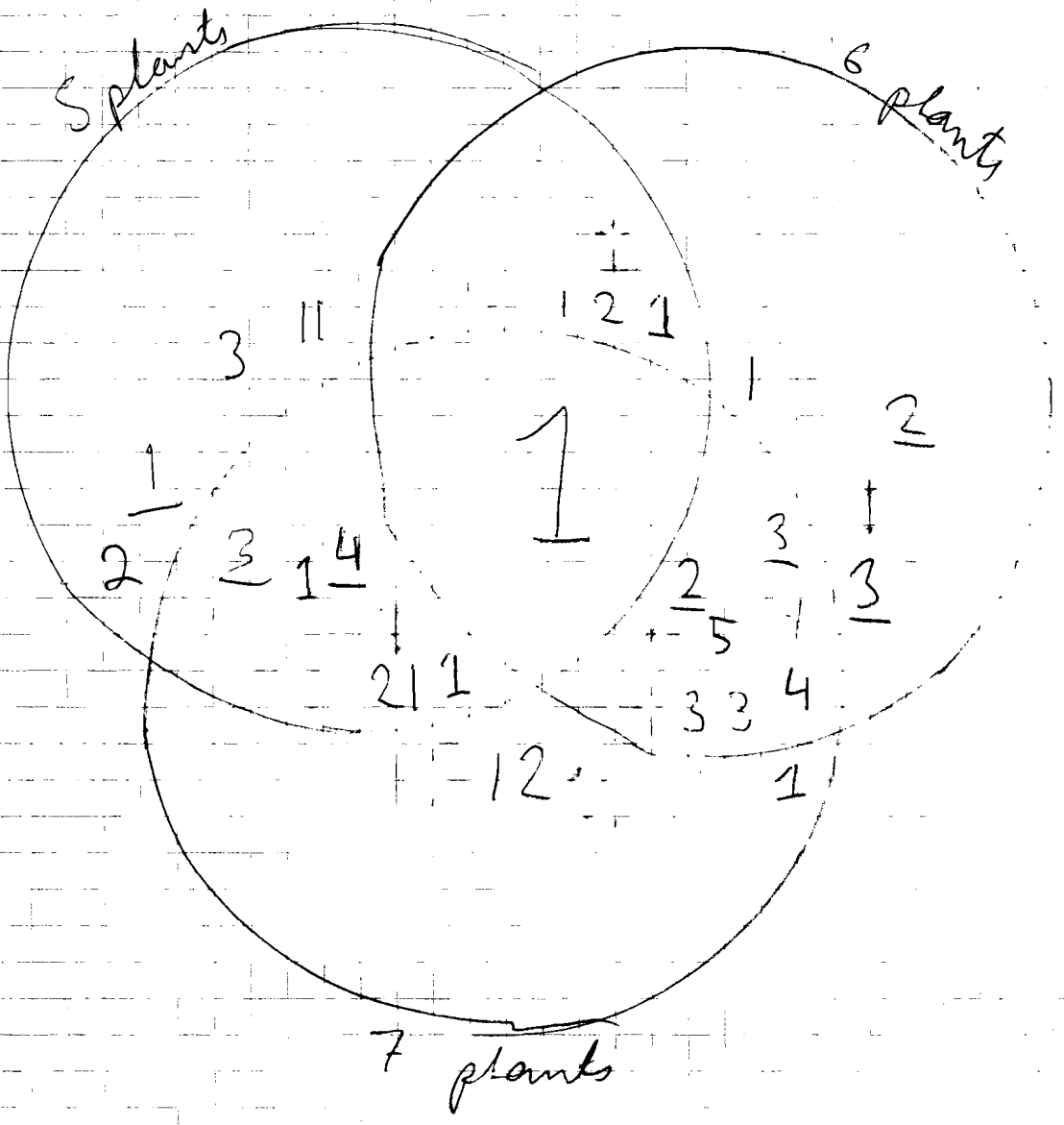
1 plant in middle:

$18 - 1 \times 3 = 15$

$10 - 1 = 9$

$15 - 9 = 6$

So I need to use 6 plants twice



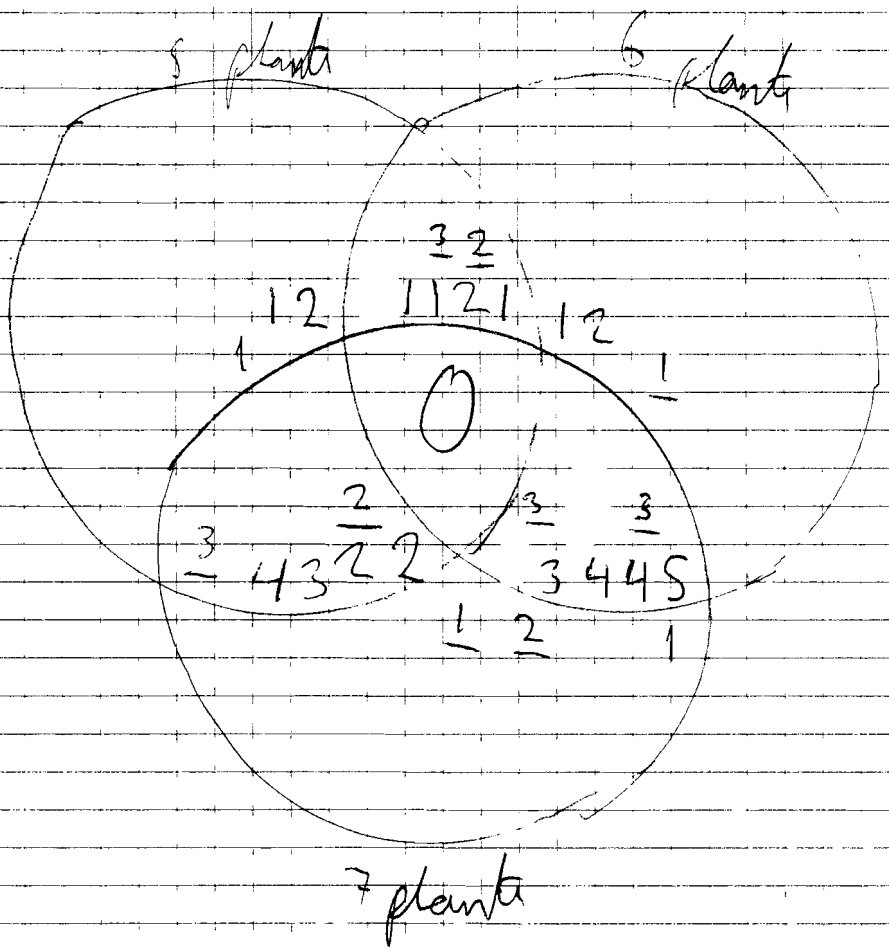

1 plant in middle: 10 solutions.

0 plants in middle:

$18 - 0 = 18$

$18 - 10 = 8$ 8 plants twice

Misha
pg 4




0 plants in middle : 6 solutions

so 34 solutions in total