

① ~~R > 3~~ $3R < 10$ $R = 3$

② 9897 ~~(A.L.M)~~ $\rightarrow$ FMFJ

③

2	10	3	11
1	13	6	12
7	14	15	6
8	9	4	5

④ 4 $(\rightarrow 6 - 1 + 4 = 9)$ $C1 \rightarrow C2 \text{ stop}$

⑤ $E1 \rightarrow C1 \rightarrow E2 \rightarrow C2 \text{ stop}$
 $\underline{5}$ $\rightarrow C2 \rightarrow E2 \rightarrow E1 \rightarrow C \text{ stop}$

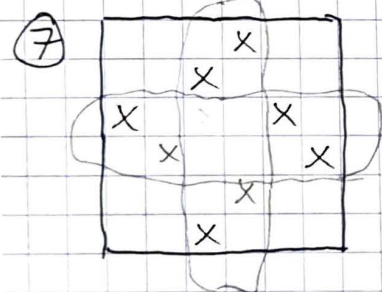
⑥ $111(X+Y+Z) + 10(T-X) = 2019$

~~2019 - 1110 = 909~~ ~~909 - 888 =~~

$X+Y+Z = 19$ ($\text{car} \equiv 9 [10]$)

$2019 - 1110 = 909$ $909 - 999 = -90$

$10(T-X) = -90$ $T-X = -9$ $T = 0$



⑧ $51324 \rightarrow 5+3+6+8 = 22$

⑨ $8^3 = 512$ $9^3 > 700$

Divisible par 11. $6 \times 7 \times 8 \equiv 6 [10]$

$86 \times 87 \times 88 / 6 = 43 \times 29 \times 14 \times 8$

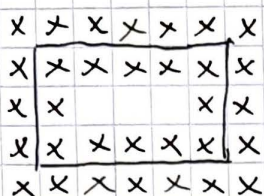
~~100001 / 11 = 9091~~ $5841 / 9 = 649$

$649 / 11 = \underline{\underline{59}}$

$86 \times 87 = 7482$

$7482 \times 8 = 59856$
 $\underline{59856}$
 658416

10



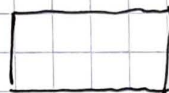
$$\begin{aligned} & (L+1 + l+1 + L-1 + l-1) \times 2 \\ & = 4(L+l) = 24 \quad \text{si } l \geq 2 \end{aligned}$$

$$L+l=6$$

• $l=1$:  $(L+2) \times 3 = 24 \quad L+2=8$

$L=6 \rightarrow \text{Aire} = 6$

• $l=2$: $L=4 \rightarrow \text{Aire} = 8$



• $l=3$: $L=3 \rightarrow \text{Aire} = 9$



11 1 segm.: 7

2 segm.: $2+2+2+2+2=10$

3 segm.:  $\times 2 + \text{L-shape} \times 4 + \text{T-shape} \times 2 + \text{corner} \times 2 = 16$

4 segm.: ~~$10+2+2+2=12$~~

5 segm: tous sauf $\equiv$  $! \times 4 \quad _ \times 2$

$7 \times 6 \times 5 / 6 = 35 \quad \text{35} \text{ } 5 \text{ } 30$

$35 - 11 = 24$

5 segm: $7 \times 6 / 2 - 2 = 19$

6 segm: 7

7 segm: 1

$7 + 10 + 16 + 24 + 19 + 7 + 1 = 84$

⑫ Si impair: $1+2+2k$ ($k \geq 2$)

→ pair.

$$1+3+3k \rightarrow 4+6k' \quad (k' \geq 1)$$

$$2+4+4k \quad (k \geq 2) \quad \text{10 ou divisible par 4}$$

non 8 OK

$$10: 1+3+6 \text{ non}$$

$$2+6+6k = 8+6k \quad (k \geq 2)$$

$$\cancel{3+8+6k} \rightarrow 14:$$

$$7: 1+2+4 \text{ non, donc 14 non}$$

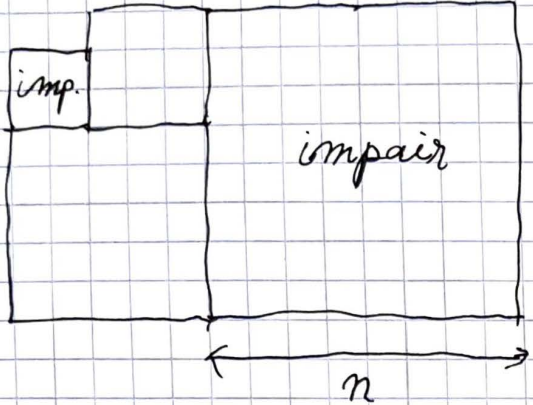
1
2
3
4
5
6
7 non
8 oui
9 non
10 non
12 non
16 non
~~20~~

$$12: 1+4+8$$

$$16: 1+3+12$$

13) $2019 \equiv 3 [4]$

→ 1 pair et 3 impairs



$$\geq n^2 + \left(\frac{n+1}{2}\right)^2$$

- | | |
|-----|-----|
| 1 | 44 |
| 4 | |
| 9 | |
| 16 | |
| 25 | |
| 36 | |
| 49 | |
| 64 | |
| 81 | |
| 100 | |
| 121 | |
| 144 | |
| 169 | |
| 196 | |
| 225 | |
| 256 | |
| 289 | |
| 324 | 676 |
| 361 | 729 |
| 400 | 784 |
| 441 | 841 |
| 484 | 900 |
| 529 | |
| 576 | |
| 625 | |

~~Mod 3~~

$2019 \equiv 3 [9]$

0, 1, 4

Mod 3: $\begin{matrix} 0 & 1 & 2 \\ & 1 & \end{matrix}$ $\begin{matrix} 0 & 2 & 1 \\ & 2 & \end{matrix}$ $\begin{matrix} 1 & 1 & 0 \\ & 2 & \end{matrix}$ $\begin{matrix} 1 & 0 & 1 \\ & 1 & \end{matrix}$ non

$\frac{5}{4} n^2 \leq 2019 \leq 2020$ $n^2 \leq 4 \times 404 = 1616$
 $n \leq 39$

$2019 = \dots \leq 2n^2$ $n^2 > 1009$ $n \geq 33$

• $n = 33$ $33^2 = 121 \times 9 = 1089$ $2019 - 1089 = 930$

$33 = 30 + 3$: $900 + 9$

$33 = 17 + 16$: $289 + 256 + 1$

$20 + 13$: $400 + 169 + 49$

$22 + 11$: $441 + 121 \times 2$ non

• $n = 35$ $35^2 = 1225$ $2019 - 1225 = 794$

$35 = 18 + 17$: $324 + 289$ non

$19 + 16$: $361 + 256$ #

$20 + 15$: $400 + 225$

~~23, 12~~

$22 + 13$: $484 + 169 = 653$ + 81 non

$23 + 12$: $529 + 144 = 673$ + 121 = 794

$(35, 23, 12, 11) \rightarrow \underline{\underline{11}}$

13 suite

• $n = 37$ $37^2 = 1369$ $2019 - 1369 = 650$

$37 = 19 + 18$ $361 + 324$ non

→ 1 sol^o

16

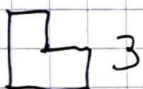


$$\nu_n = \mu_{n-1} + \nu_{n-1}$$

$$\mu_n = 2\mu_{n-1} + 2\nu_{n-1} + \mu_{n-2} = 2\nu_n + \mu_{n-2}$$



	1	2	3	4	5	6	7
μ	2	7	22	71	228	733	2356
ν	X	3	10	32	103	331	1064



$$662 + 71 = 733$$



$$2128 + 228 = \underline{\underline{2356}}$$

15

0 70 150 280

~~20~~
22 20 28
x

~~12 mi on 70'~~ 8 mi on 80'

+ 130 → + 13 mi

$$28 + 13 = 41$$

14

c

$\frac{b+c-1}{3}$

d

$\frac{b+d-1}{3}$

$\frac{a+b-1}{3}$

a

b

$$3d+1 = a+c + \frac{b+d-1}{3}$$

$$9d+3 = 3(a+c) + b+d-1$$

$$d = \frac{3(a+c)+b-4}{8} = \frac{3}{8}a + \frac{3}{8}c + \frac{1}{8}b - \frac{1}{2}$$

17 1/3?

18 ~~77 x 1,5 = 115,5~~

$$77 / 1,5 = 77 \times \frac{2}{3} = \frac{154}{3} = 51 \rightarrow 5102$$

513?