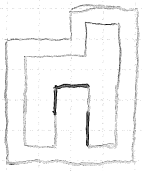
① BDFCEA

② Pentagone : 1 couleur
Rectangles : ABABC) 4

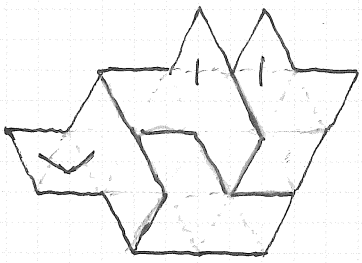
③ $18 + 18$ → $9+9$ → 27

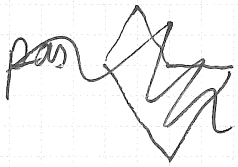
④ $15 \times 42/14 = 45$

⑤ 

⑥ 40 : petit
1 : gros
59 : perdant
→ $59+1 = \underline{60}$

⑦ 24 trg = 4×6

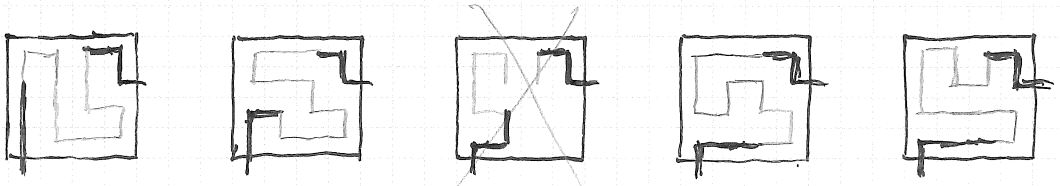


pas 

⑧

	0	1	2	3	4	5
$1 \times 5 = 5$	0	5	14	27	44	65
$2 \times 7 = 14$		5	9	13	17	21
$3 \times 9 = 27$			4	4	4	4
$4 \times 11 = 44$				0	0	
$5 \times 13 = 65$						

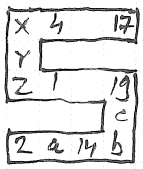
$P(n) = 5n + 2n(n-1) = n(2n+3)$
$2015 \simeq 2n^2 \rightarrow n \simeq 32$
$P(31) = 31 \times 65 = 2015 \rightarrow 31$

⑨ 

4

⑩ $99/18 \rightarrow 9$
$98/17 \rightarrow 13$
$97/16$, $88/16 \rightarrow 8$, $79/16 \rightarrow \underline{\underline{15}}$

⑪ Ligne 1 : reste = 22
Ligne 2 : reste = 23
Ligne 3 : reste = 27



$a+b = 27$
$b+c = 24$) $a-c = 3$

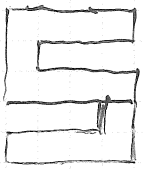
(a,b,c) :

8	19	5	non
10	17	7	non
11	16	8	OK
12	15	9	OK
15	12	12	non
16	11	13	OK
18	9	15	OK - non

$22 = 7+15 = 9+13 = 10+12$
$15+13+12 = 40 \rightarrow$ X+Y+Z contient 16 ou 18 et ce n'est pas X.
~~$43 = 18+16+9 = 18+15+10 = 18+13+12$~~
$= 16+15+12 \rightarrow$ non

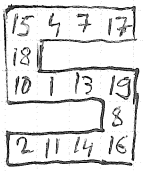
$\Rightarrow 18 \in \{X,Y,Z\}$: 18, 15, 10 ou 18, 13, 12

(11) suite

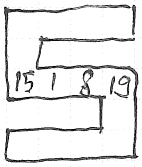


Si 18, 15, 10, alors 11 et 16 pris par (a, b, c)

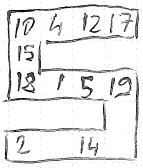
→ ligne 2 : 10 + 13 ou 15 + 8 ou 18 + 5



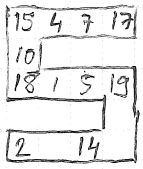
3, 6, imp (5)



imp (5)

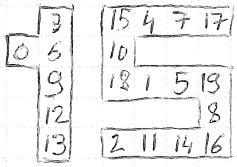


3, 6, 7, 8, 13, 9
imp.

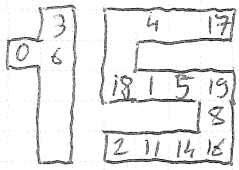


3, 6, 8, 13, 3, 12

43 − 30 = 13



Si 18, 13, 12, alors (a, b, c) = (11, 16, 8)



ligne 2 = 1 + 5 + 19 + 18

3, 6, 7, (9 ou 10), 15 = 43 imp.

(12) c : côté

Aire totale : $2 \times 7\,c^2 = 24\ cm^2$

$4c^2$ $4c^2 = 4 \times \frac{24}{2 \times 7} = 48/7\ cm^2$

Verre : 12 cm²

$2h^2 = c^2$

Aire totale : $(c^2 + 4ch + 2h^2) \times 2 = 8(ch + h^2)$

Partie teintée : $(ch + h^2) \times 2 = 2(ch + h^2)$

$= 1/4 \times 24 = 6\ cm^2$

(15) 1, 2, 6, 24, 120, ~~720~~

→ ts les chiffres sont de 1 à 5

$3 \times 24 < 100$ → au moins un 5

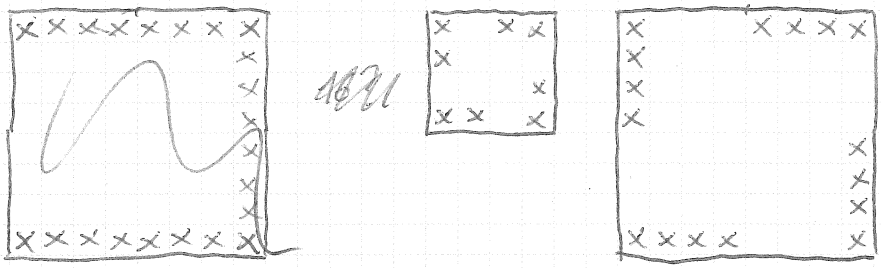
x55 ? → 255 non

→ 1 seul 5. 15x ou 1x5

15x → 154 non

1x5 → 120 + 1 + 24 = 145

(16)



(7) $a \times b \times c$

$ab + (b-1)c + (a-1)(c-1) = \frac{1}{2}abc \qquad a,b,c \geq 3$

$ab + bc + ac - a - b - c + 1 = \frac{1}{2}abc \qquad bc$ pair

$$a = \frac{bc - b - c + 1}{bc/2 - b - c + 1} = 1 + \frac{bc/2}{bc/2 - b - c + 1}$$

$b + c - 1 \mid bc/2$ et $\neq$

~~(3,4) → a=4~~

$bc/2 = k(b + c - 1) \qquad a = 1 + k/(k-1) \rightarrow k = 2$

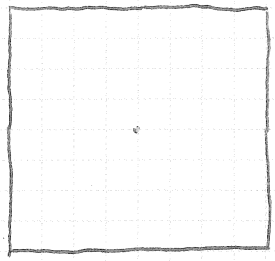
$b = \frac{k(c-1)}{c/2 - k} \qquad c$ pair $\qquad a = 3$

$k = 2 \rightarrow b = \frac{2(c-1)}{c/2 - 2} \qquad c = 6,\ b = 10,\ a = 3$

$c \equiv 2 \ [4]$

$abc = 180$

(18)



$\left(\frac{1}{2}+\frac{1}{4}\right)$ aire totale ?

$\frac{3}{4} \times 40^2 = 3 \times 400 = 1200\ cm^2$

(13)

2 0 1 ▨ 5

11

$A \rightarrow B \rightarrow C = 2015$

$B \geq 2020$

$2015 + 16 = 2031 \rightarrow B \geq 2030$

$2015 + 11 + 4 + 7 < 2040 \rightarrow B < 2040$

B : 2 0 3 ?

16

$B = 203u$

$N(u) = u - 1 \rightarrow u = 8$

$B = 2038$

$\rightarrow A \geq 2050$

A : 2 0 5 ?

16

$2038 + 16 = 2054$ $A = \underline{2057}$ OK

A : 2 0 6 ?

17

$2038 + 17 = 2055$ imp.

(14) $q = \overline{abc}$

$\overline{abc} \times \overline{cba} + n = 100000$

$\overline{1b9} \times \overline{9b1} = 109 \times 901 + 10(109+901)b + 100b^2$
$= 98209 + 10100b + 100b^2$
$\rightarrow b = 0$ imp.

$\overline{2b8} \times \overline{8b2} = 208 \times 802 + 10(208+802)b + 100b^2$
$= 166816 + --$

$\overline{1b8} * \overline{8b1} = 108 \times 801 + 10 \times 909b + 100b^2$
$= 86508 + 9090b + 100b^2$ imp.

$\overline{1b7} * \overline{7b1} = 75007 + 8080b + 100b^2$ $b=3$
$= 75007 + 24240 + 900$ $> 100\,000$
#1

$\overline{2b7} \times \overline{7b2} = 145314 > 100000$

$\overline{1b6} \times \overline{6b1} = 63706 + 7070b + 100b^2$
$= 63706 + 35350 + 2500$ non $b=5$
$= 63706 + 28280 + 1600$ non $b=4$

$\overline{1b5} \times \overline{5b1} = 52605 + 6060b + 100b^2$
$[b=8] = 52605 + 48480 + 6400$
$= 99405$ non

$[b=9]$ ~~52605~~ + 45450 + 8100 non

$\overline{1b4} \times \overline{4b1} = 41704 + 5050b + 100b^2$ $b=9$
$= 41704 +$ ~~40360~~ $+ 45450 + 8100$ non

$\overline{2b4} * \overline{4b2} = 82008 + 6060b + 100b^2$ non

$\overline{3b2} \times \overline{2b3} = 61306 + 5050b + 100b^2$
$[b=7] = 61306 + 35350 + 4900$ non
$[b=6] = 61306 + 30300 + 3600$

2 bis $\overline{1b5} \times \overline{5b1} = 52605 + 42420 + 4900 = 99925$
$b=7$ OK 2 sol