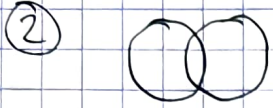


① 7



C-C: 2  
C-D:  $3 \times 4 = 12$   
D-D: 3

→ 17

③ 1-9: nb impair de 2  
+3 +3 +3 -3 +2 imp.

~~1 4 5~~ +3 +3 +2 +2 -2

1 3 6 4 7 9 imp.

7-9-6 ou 6-9-7

1 3 5 8 6 9 7 ④ 2

④ 1 à 10 avec +

11 = 12 + 3 - 4

12 à 14

15 = 14 + 3 - 2

16 = 14 + 2

17 = 14 + 3

18 = 21 - 3

19 = 14 + 2 + 3

20 = 21 + 3 - 4

21

22 = 21 + 4 - 3

23

→ 0

⑤ 1 + 2 + 3 + 4 + 5 = 15

⑥ A B C A + 2B + C  
D E F + 2D + 4E + 2F  
G H I + G + 2H + I

$4 \times 9 + 2 \times (8 + 7 + 6 + 5) + 10$

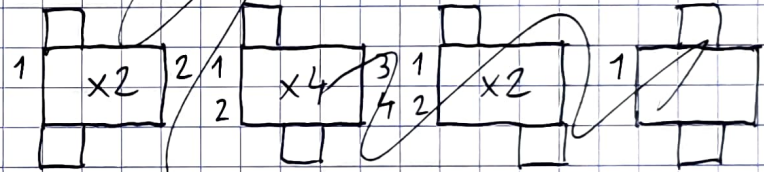
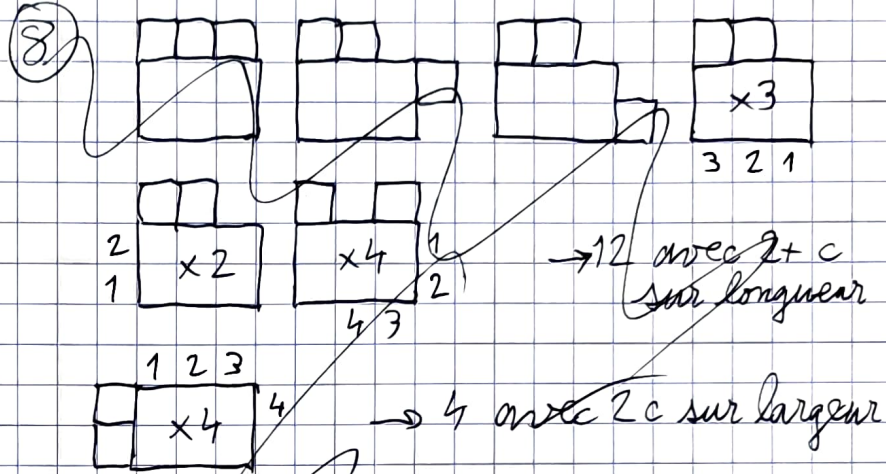
= 36 + 52 + 10 = 98

⑦ 3G en 2' + 4G en 2'

→ 7G en 2'

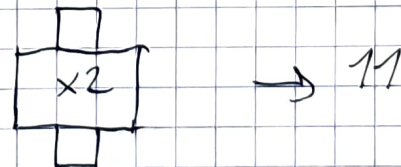
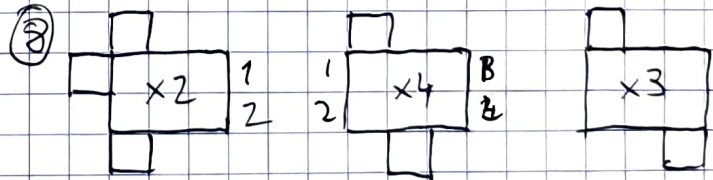
$350 / 7 = 50$      $50 \times 2' = 100'$

→ 1h 40 min



⑧

→  $12 + 4 + 9 + 7 = 32$



$$\textcircled{9} \quad \overline{abc}$$

$$\overline{ab} + \overline{ba} + \overline{ac} + \overline{ca} + \overline{bc} + \overline{cb} = 22(a+b+c) = 100a + 10b + c$$

$$78a = 12b + 21c$$

$$26a = 4b + 7c \quad 2|c \quad c = 2c'$$

$$13a = 2b + 7c' \quad 1 \leq c' \leq 4$$

$$\boxed{a, b, c \neq 0}$$

$$c' = 1 \rightarrow b = 3 \text{ et } a = 1 \rightarrow 132$$

$$c' = 2 \rightarrow b = 6 \text{ et } a = 2 \rightarrow 264$$

$$c' = 3 \rightarrow b = 9 \text{ et } a = 3 \rightarrow 396$$

$$c' = 4 \rightarrow b = 12 \text{ imp.}$$

3 sol<sup>o</sup>

$$\textcircled{10} \quad \text{Si } n = \overline{ab} : 2n - 9 \text{ chiffres} \quad (1 \text{ sol}^o \text{ car } fct \uparrow)$$

$$2n - 9 = \frac{5}{2}n$$

$$4n - 18 = 5n \quad n = -18 \rightarrow n \geq 100$$

$$3n - 9 - 99 = \frac{5}{2}n$$

$$n = 2(9 + 99) = 216$$

$$\textcircled{11} \quad \overline{abc} / (abc) > 50 \quad \overline{abc} / a < 200 \Rightarrow bc \leq 3$$

$$\bullet b = c = 1 : \overline{a11} / a : a | 11 \Rightarrow a = 1 \quad 111 \text{ solution}$$

$$\bullet b = 1, c = 2 : \overline{a12} / (2a) : a | 6 \rightarrow 112, 212, 312, 612$$

$$\bullet b = 1, c = 3 : \overline{a13} / (3a) : a | 13 \text{ et } 3 | a13 \text{ imp.}$$

$$\bullet b = 2, c = 1 : \overline{a21} / (2a) : \text{imposs. (parité)}$$

$$\bullet b = 3, c = 1 : \overline{a31} / (3a) : a | 31 \text{ et } 3 | a31 \text{ imp.}$$

5 sol<sup>o</sup>

(12)

$$W = 1 \text{ ou } 2$$

• Si  $W = 1, D = 7$

$$1(10A + 1) \equiv 3(100A + 10N + 7) \pmod{1000}$$

$$290A + 30N + 20 \equiv 0 \pmod{1000}$$

$$29A + 3N + 2 \equiv 0 \pmod{100} \quad N \geq 2 \quad 8 \leq 3N + 2 \leq 29$$

$$A = 3: 3N + 2 = 100 - 87 = 13 \text{ imp.}$$

$$A = 6: 3N + 2 = 200 - 2 \times 87 = 26 \rightarrow N = 8$$

$$P00687 \times 3 = 1R02061$$

$$3 \times 687 = 2061 \quad \uparrow \quad C = 2$$

$$3 \times P0 = 1R0 \rightarrow O = 5$$

$$3 \times P5 = 1R5$$

P	R
3	0 non
4	3
9	non

$$450687 \times 3 = \underline{1352061} \rightarrow \text{solution}$$

$$A = 7: 7 \times 29 = 203 \quad 203 + 3 \times 29 < 300$$

• Si  $W = 2, D = 4$

$$3 \times AN4 = COA2$$

$$O = 5$$

$$P \geq 7$$

P	R
7	2 non
8	5 non
9	8 OK

$$W = 2, D = 4, O = 5, R = 8, P = 9$$

- Si  $A = 1: N = 0 \text{ imp.}$

- Si  $A = 3:$

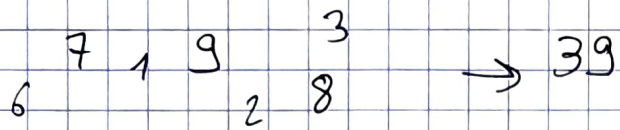
- Si  $N = 1: A = 4 \text{ imp.}$

- Si  $N = 3: A = 0 \text{ imp.}$

- Si  $N = 6: A = 9 \text{ imp.}$

- Si  $N = 7: A = 2 \text{ imp.}$

13



15

- 2 à 1 chiffre
- 4 à 2 "
- 8 à 3 "
- 16 à 4 "
- 32
- 64
- 128
- 256
- 512
- 1024 10

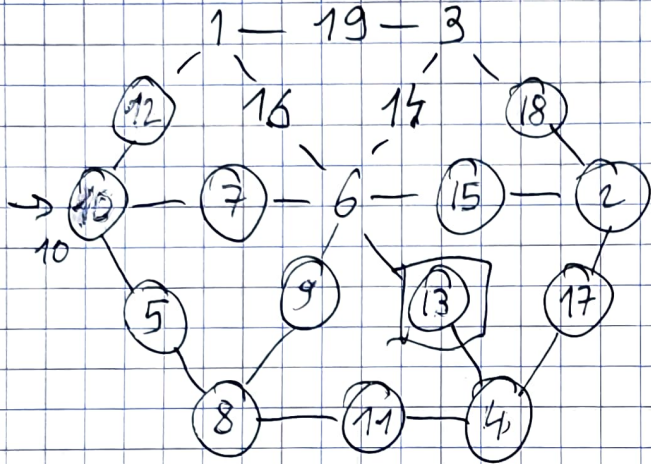
Le 2046<sup>e</sup>: 777... 7 à 10 chiffres.

Le 2030<sup>e</sup>: 77777737777

Le 2022<sup>e</sup>: 7777733777

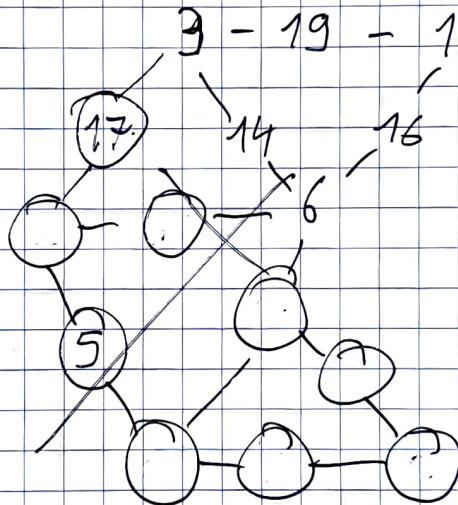
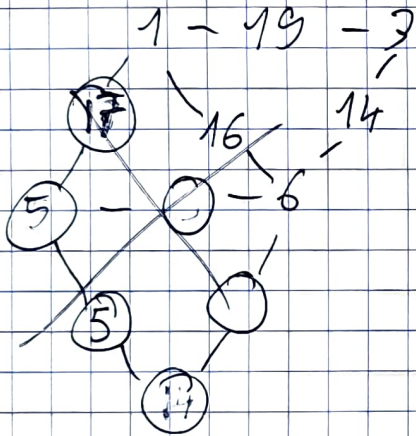
Le 2023<sup>e</sup>: 7777737333

14  $19 + 1 + 3 = 23$



$17 = 1 + 16 = 2 + 15 = 3 + 14$   
 $= 4 + 13 = \cancel{5 + 12} = 7 + 10 = 8 + 9$

$4 + 13 \quad 2 + 15$   
 $5, 19, 11, 12, 18, 17$



$$(17) \quad F_5 = 5 \quad F_6 = 8 \quad F_{12} = 144$$

AM 1 1 2 3 5 8 13 21 34 55 89 144 33

77 10 87 97 84 81 65<sub>(20)</sub> 46 11 57 68

25<sub>(25)</sub>

1 1 2 3 1 0<sub>(6)</sub> ... 0<sub>(12)</sub>

$$6 \times 25 = 150$$

$$(16) \quad 10 = IE = BD = BE = \sqrt{676} = 2\sqrt{169} = 26$$

$$S(\text{area } IE \times EC) = S(\text{IECF}) = 1014$$

$$EC = 1014 / 26 = 507 / 13 = 40 - 1 = 39$$

$$FC = 39$$

$$AD = AF = x$$

$$(x+26)^2 + (26+39)^2 = (x+39)^2 \quad x = 13y$$

$$(y+2)^2 + 25 = (y+3)^2$$

$$4y + 29 = 6y + 9 \quad \rightarrow \quad 2y = 20 \quad y = 10$$

$$x = 130$$

$$S(\text{ADIF}) = 26x = 2 \times 1690 = \underline{3380}$$