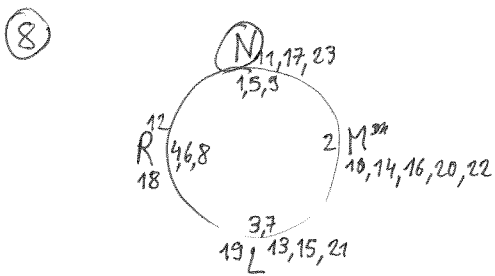


⑦ $1 - 4 - 4 + 9 = 13 - 13 + 27 = \underline{40}$



⑨ $2006 = 2048 - 42$ $2006 = 2 \times 17 \times 59$

$1024 + 512 + 256 + 128 + 64 + 16 + 4 + 2$
1920 1984

NIHILLO LOTO

equiv. $2048 = 2^{11}$

$2 \rightarrow 1$

$4 \rightarrow 2$

$8 \rightarrow 3 \dots \underline{11}$

⑩

1. 5
- 2.
- 3.
- 4.
- 5.

⑪ $\frac{10}{18} = \frac{5}{9}$ ← cheque personne

$\frac{5}{9} + \frac{4}{9}$ ~~10~~ $10 \times \frac{5}{9} + 10 \times \frac{4}{9}$

$2 \times \frac{4}{9} \rightarrow 8 \times \frac{1}{9}$

10 découpes 5 et 2

$10 \times \frac{5}{9} + 8 \times (\frac{4}{9} + \frac{1}{9})$

$10 + 2 \times 8 = \underline{26}$

⑫ aaaaaa div. 49

$111111 = 15873 \times 7 = 7 \times 2267 \times 411 \times 1001$
 $\begin{matrix} 11 \\ 61 \\ 51 \\ 21 \end{matrix}$

$111111 = 3 \times 37 \times 1001 = 3 \times 7 \times 11 \times 13 \times 37$
 \downarrow
 7×143

$777777 = 3 \times 7^2 \times 11 \times 13 \times 37$

$1 \quad 3 \quad 7 \quad 11 \quad 13 \quad 37 \quad 21 \quad 33 \quad 39 \quad 49 \rightarrow 214$
 $\begin{matrix} \swarrow & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow \\ 214 & & 132 & 142 & 121 & & & & & 88 \end{matrix}$

⑭ 2006 pair

$10 + 1 + 1 + 1 = 13$
 $13 + 10 + 1 + 2 + 1 = 27$
 $27 + 10 + 1 + 3 + 1 = 42$
 $\underbrace{\hspace{1.5cm}}_{15}$

$f(0)$	$f(1)$	$f(2)$...	$f(1003)?$
0	13	27	42	
	13	14	15	
	1	1		
		0		

$f(x) = 13x + \frac{x(x-1)}{2}$

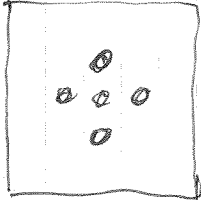
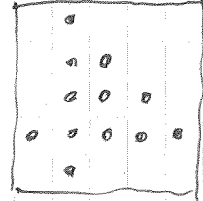
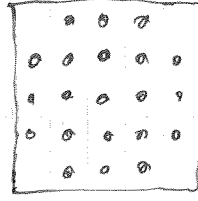
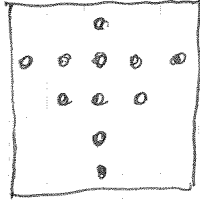
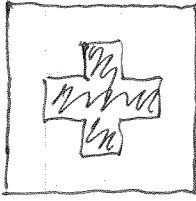
$f(1003) = 13 \times 1003 + \frac{1003 \times 1002}{2}$

$1005006 / 2 = 502503$
 $+ 413039$

 515542

$1003 \times (13 + 501) = 514 \times 1003$
 $= 515542$

10



$$5 + 11 + 21 + 12 + 5 = \underline{54}$$

15

3	6 ₃	5	4	1	2
1	4	6 ₂	2	5	3
5 ₂	2	1	3	6 ₄	4
2	5	4	6	3	1
4	1	3	5	2	6
6	3	2	1	4	5

	6		
5		6	
6			1
		6	6

pasdes

	6		1	2	
1	2	6	3		
5		1	2	6	
			6	2	1
2	1				6
6		2	1		

	6			2	
2		6			
5		2		6	
			6	2	1
	2				6
6		1	2		

	6		1		
1	2	6			
5		1	6		
			6	2	1
2	1				6
6		2	1		

16) arith

$$a \times b = 2006 + c \times d$$

~~assez b~~ $a > c, b > d$

$$ad = bc \rightarrow \text{val}_p(a) + \text{val}_p(d) = \text{val}_p(b) + \text{val}_p(c)$$

~~assez val~~ $a_p + d_p = b_p + c_p$

$$ab = 2006 + \frac{ad^2}{b}$$

Si $p|a$ et $p \nmid b$, alors $p|c$, et $p|2006 \rightarrow p = 2, 17$ ou 59

Si $p|a$ et $p|b$, alors $p^2 | 2006 + cd$

• Si $p \neq 2, 17, 59$:

Si $p|a$, alors $c_p = d_p = 0$, donc $a_p = b_p$
idem pour les autres. ($c_p = d_p, a_p = b_p = 0$)

• Si $p = 2, 17$ ou 59 :

~~Alors~~ Si $p|a$, alors $p|c$ ou $p|d$

• Si $p|d$, alors

$$d^2 = b^2 - 2006 \frac{b}{a}$$

~~assez~~ $a = 1003$

$$\rightarrow d^2 = b(b-2)$$

$$2006 \frac{b}{a} = b^2 - d^2 = (b+d)(b-d)$$

• Si $a = 2, c = 1$, ~~imp~~ $d \nmid b = 2d, 4d = 2006 + d$ ~~imp~~ imp.

• Si $a = 17$:

$$118b = (b+d)(b-d)$$

$$d^2 = b^2 - 118b = b(b-118)$$

~~assez~~

$$p|118 = 2 \times 59$$

$$2b = (b+d)(b-d)$$

$$b = 59k$$

$$59k(k-2)$$

$$32 \times 21 \times 62$$

$$32 \times 62 = 1984$$

$$3968$$

$$41664$$

$$3968$$

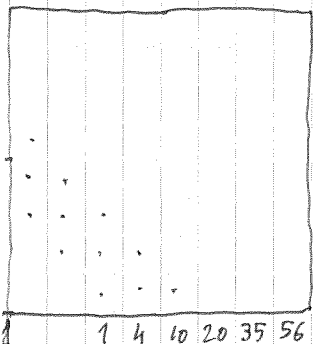
17



$$\frac{3 \times 8 \times 7}{6} = 84$$

$$84 - 8 = 76$$

$$\left(\frac{64 \times 63 \times 62}{6} - A \right) \times 5$$



Vertical: ~~8~~ $8 \times \frac{8 \times 7 \times 6}{6} = 84$ (A_1)
 $64 \times 7 = 448$

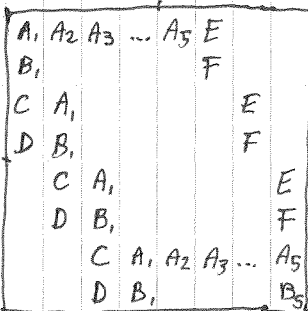
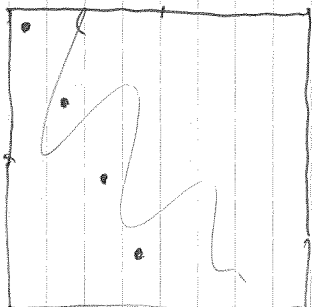
Horiz: (A_2) 448

45° : $2 \times (1 + 4 + 10 + 20 + 35 + 56)$
 $\times 2$
 $140 + 56 = 196$

$\rightarrow 2 \times 196 = 392$ (A_3)

$$\frac{5 \times 4 \times 3}{6} \quad \frac{6 \times 5 \times 4}{6}$$

3×2 : $4 \times (10 \times 4 + 4) = 4 \times 44 = 176$ (A_4)

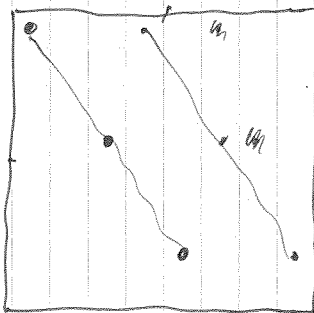
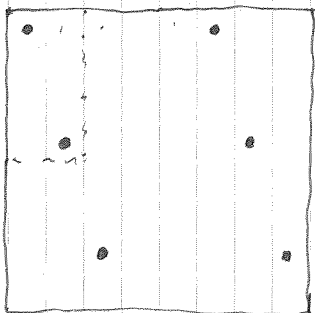


Suite:

$$41664 - 776 =$$

$$40888 \times 5 = 204440$$

4×2 : $4 \times (6 \times 2) = 48$ (A_5)



4×3 : $4 \times (4 \times 2) = 32$ (A_6)

$$A = 896 + 392 + 176 + 3/2 \times 48 + 32$$

$$= 520 + 176 + 80 = 776$$

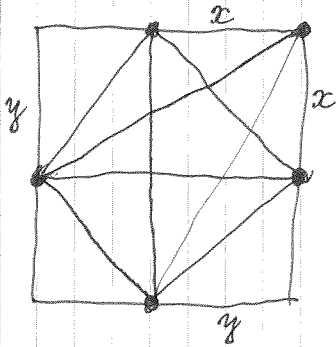
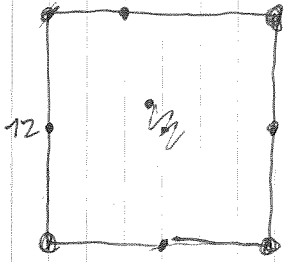
$$\begin{array}{r} 896 \\ 392 \\ \hline 1288 \\ 176 \\ \hline 1464 \end{array}$$

$$1464 + 80 = 1544 \times 5 = 7720$$

$$160 \times 21 \times 62$$

$$\begin{array}{r} 62 \\ \times 16 \\ \hline 772 \\ 62 \\ \hline 992 \\ \times 21 \\ \hline 992 \\ 1984 \\ \hline 208320 \\ 3880 \\ \hline 204440 \\ 7720 \\ \hline 200600 \end{array}$$

18



$a = 12$

$\frac{a^2}{2} ? = 72$ since $x > a/2$

$$\frac{x^2}{2}, \frac{xy}{2}, a^2 - xy - \frac{(a-y)^2}{2} = \frac{a^2 + 2ay - y^2 - 2xy}{2}$$

$$\frac{a(x+y)}{2} - \frac{x^2}{2} - \frac{(a-x)y}{2} = \frac{ax - x^2 + xy}{2}$$

$$\frac{a(a-x+a-y)}{2} - \frac{(a-x)y}{2} - \frac{(a-y)^2}{2} = \frac{xy - x - y}{2} + \frac{1}{2}(-ax - ay - ay + xy + 2ay - y^2) = \frac{xy - ax - y^2 + a^2}{2}$$

Si $x = y$,
 $= na$

$$\frac{1 + 2n - 3n^2}{2}$$

~~$$\frac{1 + 2n - 3n^2}{2}$$~~

$$\min\left(\frac{1-n}{2}, \frac{n^2}{2}\right)$$

$$1 - n = n^2$$

$$n^2 + n - 1 = 0 \quad n = \frac{-1 \pm \sqrt{5}}{2}$$

$$1 - n = \frac{3 - \sqrt{5}}{2} \quad \frac{1 - n}{2} = \frac{3 - \sqrt{5}}{4}$$

$36(3 - \sqrt{5}) ?$

2,236
0 764
x 36
4584
2292
24584