

⑧  $5 \times 6 \times 2 \times (1+0+1) + 0 \times 1 \times 2$

⑨ 

1	2
x	x-1
y	y+1

$10+x+z$

1	z	2
x	9	x-1
y	1+z-y	y+1

$1+z-y \geq 3$

$y \geq 3$

$\rightarrow z \geq 5$

1	2
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1)  $y=3$

$y-1=2$

①	9	②
6	<del>8</del>	5
③	7	④

2)  $y=4$

$y-1=3$

1	6	2
8	9	7
4	3	5

<del>1</del>	9	<del>2</del>
<del>4</del>	6	<del>5</del>

3)  $y=5$

non

1	7	8	2
5	3	4	6


4)  $y=6$

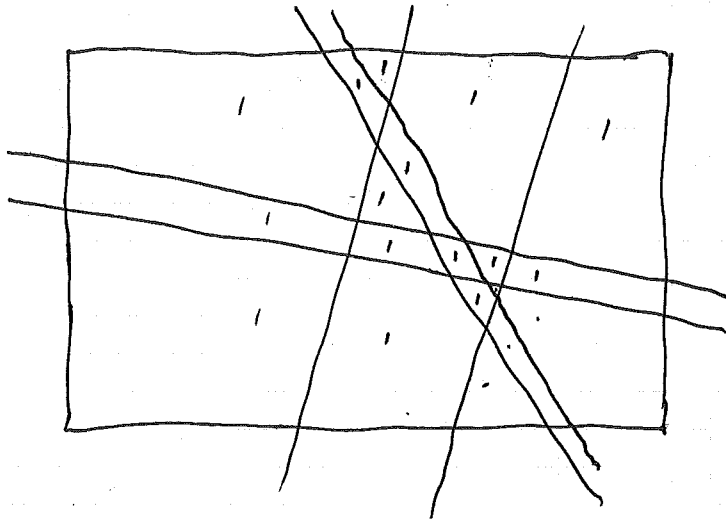
1	8	2
5	9	4
6	3	7

5)  $y=7$

1		2
7		8

10

$$7 + 3 + 4 + 5 = 19$$



11

$$121 \rightarrow 3$$

$$1232131 \rightarrow 7$$

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

$$5 \times 4 + 1 = 21?$$

1 2 3 2 1 3 1 4 2 4 3 4 1

12

18xx

1600 - 1681

~~4424~~  $43^2 = 1849$   $y = 43$   
 $\uparrow$   
 43 ans  $\rightarrow$  1806

13

1P			
	<del>2P</del>		
			2C
2T			

symétries 3/4  
et K/T

1P	2K	4C	3T
3C	4T	2P	1K
4K	3P	1T	2C
2T	1C	3K	4P

1P	3C	2K	4T
2T	4K	1C	3P
3K	1T	4P	2C
4C	2P	3T	1K

1P	3T	2K	4C
4C	2K		
3K			2C
2T			

13

à 1 sym. 3/4 près

1	3	2	4
2	4	1	3
3/4	1	4/3	2
4/3	2	3/4	1

1	3	2	4
2	4	3	1
3	1	4	2
4	2	1	3

1	2	4	3
3	4	2	1
4	1	3	2
2	3	1	4

1	2	3/4	4/3
3	4	2	1
4	3	1	2
2	1	4/3	3/4

1	3	2	4
4	2	1/3	3/1
3	1	4	2
2	4	3/1	1/3

1	3	2	4
4	2	3	1
3	4	1	2
2	1	4	3

14)  $aba + cdc = \text{deed}$   $S = 2+2+1 \rightarrow b$

1.  ~~$bbb + bdb = \text{ffff}$~~

$e = 1$

$aba + cdc = 1ee1 \quad a \neq c$

1.  $bbb + cdc = 1bb1 \rightarrow d = 9 \quad bbb + 999 = 1bb1$

$b+d+1 = 10+b \quad b+c+1 = 10+b \rightarrow c = 9$

$\downarrow$   
 $b = 2$

2.  ~~$bbb111 + cdc = 1ee1$~~   $\rightarrow c = 0 \text{ imp.}$   $[222 + 999 = 1221$

3.  $aba + bdb = 1bb1$

$a+b = 11 \quad b+d+1 = 10+b \rightarrow d = 9$

4.  ~~$aba1a + 1d1 = 1ee1$~~   $\rightarrow a = 0 \text{ imp.}$

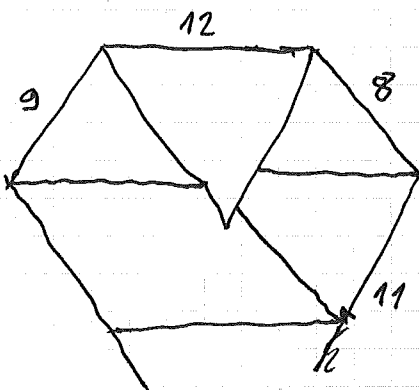
$\rightarrow aba + b9b = 1bb1$

$a+b+1 = 10+b \rightarrow a = 9$

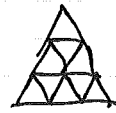
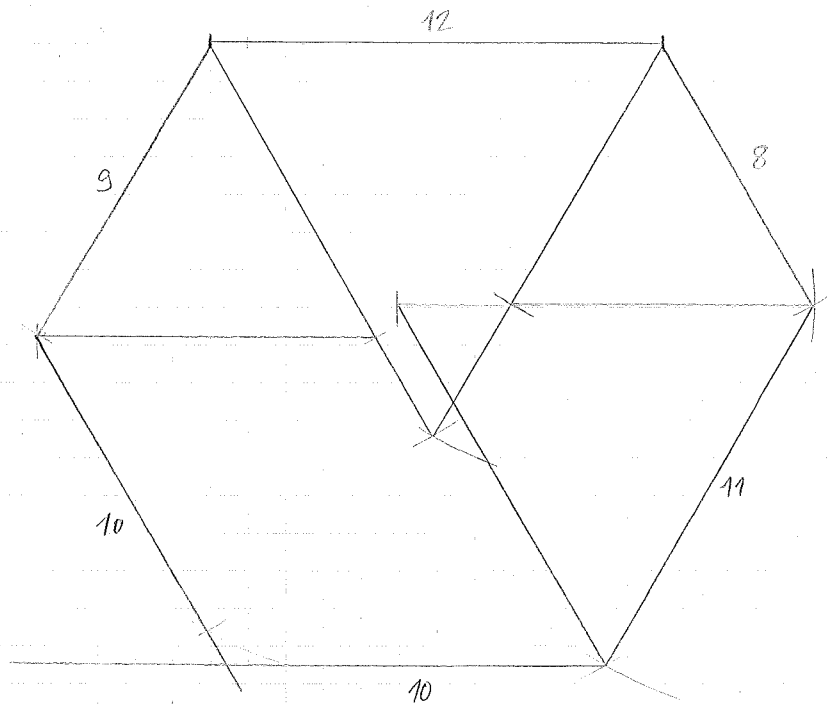
$9b9 + b9b = 1bb1 \rightarrow b = 2$

$[929 + 292 = 1221 \quad \underline{\underline{2 \text{ sol}^\circ}}$

15)



15



Triangle equil.  $12 + 9 + 10 = 31$

- triangles equil. 10, 11 et 12

Par TE n :  $n = \begin{matrix} 1 & 1 \\ 2 & 4 \\ 3 & 9 \end{matrix}$   
↓  
 $n^2$

$$31^2 - 10^2 - 11^2 - 12^2 = 961 - 100 - 121 - 144 = \boxed{596}$$

$$(16) \quad 120 = 2^3 \times 3 \times 5$$

$$\cdot 3 \times 5 \times 8, 4 \times 5 \times 6$$

$$1. \quad 3 \times 5 \times 8:$$

$$\cancel{2 \times 3} \quad 3 \times 6 = 18 \text{ int.}$$

$$2(3+6+3 \times 6) = \cancel{27} \cancel{18} 54 \text{ F}$$

$$4(1+3+6) = 40 \text{ A}$$

$$8 \text{ C}$$

$$2. \quad 4 \times 5 \times 6:$$

$$2 \times 3 \times 4 = 24 \text{ int.}$$

$$2(2 \times 3 + 2 \times 4 + 3 \times 4) = 52 \text{ F}$$

$$4(2+3+4) = 36 \text{ A}$$

$$8 \text{ C}$$

$$24 \times 0 + 52 \times 1 + 4 \times 2 = \underline{60}$$

①  $a > b > c$   
 $a > 2b$   
 $3b > 4c$   
 $3c > a$   
 $a + b + c = 100$

$3a > 6b > 8c$   
 $9a > 18b > 24c > 8a$

~~$b > a > 3a$~~

~~$a > 2b$~~   
 ~~$b > 3c$~~

$(1 + \frac{1}{2} + \frac{1}{3}) a \approx 100$

$11a \approx 600$

$a \approx 55$

•  $a = 54$   
 $\rightarrow c > 18$   
 $27 > b$  )  $b + c = 46$

$b = 26, c = 20$

$3b = 78 \quad 4c = 80 \quad \text{imp.}$

•  $a = 55$

$3c > 55 \rightarrow c \geq 19$

$3b > 76 \rightarrow b \geq 26$

)  $\rightarrow 19, 26, 55$

•  $a = 56$

$3c > 56 \rightarrow c \geq 19$

$3b > 76 \rightarrow b \geq 26$

imp.

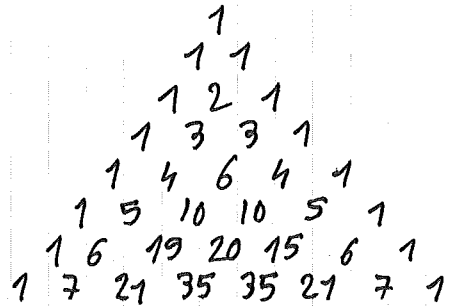
18)  $1 \rightarrow 36$

6 personnes

$$\frac{36 \times 35 \times 34 \times 33 \times 32 \times 31}{6!} = A$$

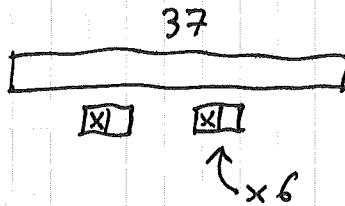
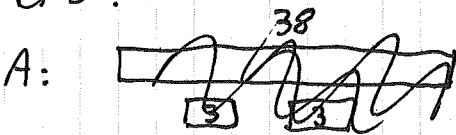


$$\begin{aligned} 6 &= 6 \\ &= 1+5 \\ &= 2+4 \\ &= 3+3 \\ &= 1+1+4 \\ &= 1+2+3 \\ &= 2+2+2 \\ &= 1+1+1+3 \\ &= 1+1+2+2 \\ &= 1+1+1+1+2 \end{aligned}$$



6: 31

1+5: n



$A(n) = \dots$   $n = 37$   $A(n)?$

$A(12) = 1$

$A(13) = 6 + 1 = 7$

$A(14) = 7 + \frac{7 \times 6}{2}$

$a + b + c + d + e + f + g = 25$

1nb  $\rightarrow 1$

2nb  $\rightarrow 26$

3nb  $\rightarrow 26 + 25 + 24 + \dots + 1 = \frac{26 \times 27}{2} = \binom{27}{2}$

4nb  $\rightarrow \binom{27}{2} + \binom{26}{2} + \dots + \binom{2}{2} = \binom{28}{3}$

7nb  $\rightarrow \binom{31}{6}$

$\rightarrow \binom{36}{6} - \binom{31}{6}$

$\binom{n}{6} - \binom{n-5}{6}$



18 suite

$$6 \times 7 \times 34 \times 11 \times 4 \times 31$$

$$\begin{array}{r} 124 \\ \times 11 \\ \hline 124 \\ 124 \\ \hline 1364 \\ \times 34 \\ \hline 5456 \\ 4092 \\ \hline 46376 \\ \times 7 \\ \hline 324632 \\ \times 6 \\ \hline 1947792 \\ \phantom{19}4 \end{array}$$

$$\begin{array}{r} 1947792 \\ - 736281 \\ \hline \end{array}$$

1211511

$$31 \times 30 \times 29 \times 28 \times 27 \times 26$$

$$31 \times 29 \times 7 \times 9 \times 13$$

$$\begin{array}{r} 31 \\ \times 29 \\ \hline 279 \\ 62 \\ \hline 899 \\ \times 13 \\ \hline 11687 \\ \times 9 \\ \hline 105183 \\ \times 7 \\ \hline 736281 \end{array}$$

$$900 \times 13 = 11700$$

$$- 13$$