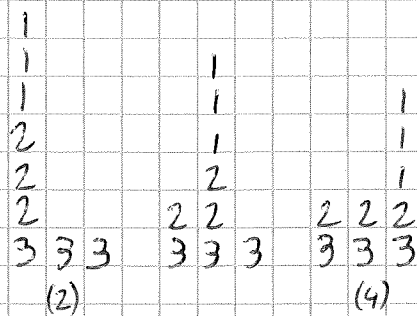
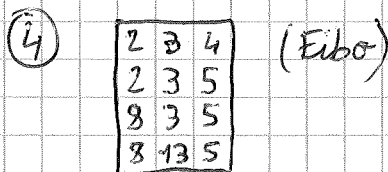
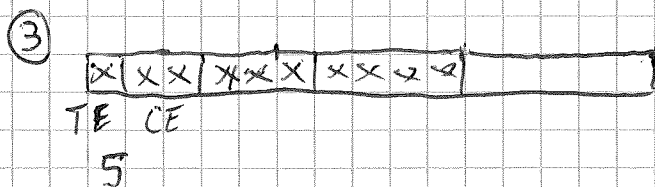


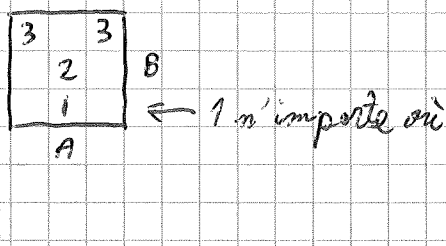
$4+3=7$



$4+2=6$



⑤



⑥

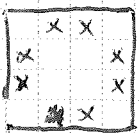
20 a b c 12

$20/c = 360/90 = 4 \rightarrow c=5$

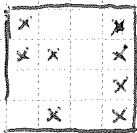
$a/12 = 90/180 = 1/2 \rightarrow a=6$

20 6 3 5 12

7

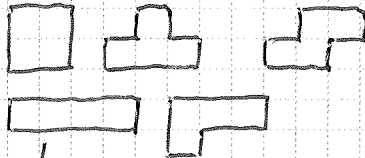
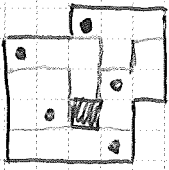


?



8?

8



→ an 1er

9

GB, GE, CP, B

	GB	GE	CP	B
A:	1	0	0	0
B:	0	0	1	0
C:	0	1	0	0
D:	0	0	0	1

⑩ 2012 → 1
 3 → 2

- 3: 81
- 4: 65
- 5: 61
- 6: 37
- 7: 58
- 8: 89
- 9: 145
- 10: 42
- 11: 20
- 12: 4
- 13: 16
- 14: 37

période: 8
 2012 ≡ 12 [8]
 → 4

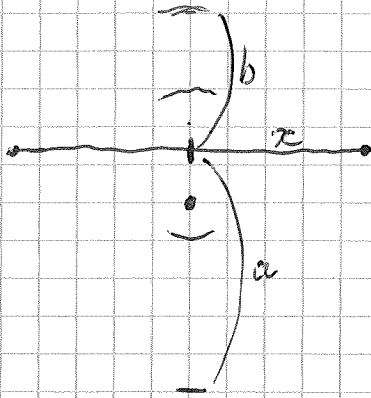
⑪ 1 colonne: 1 ou 3

Nb de colonnes à 3:

- 0: $1+1+3 \rightarrow 3 \times 5 \times 4 = 60$
 ↑
 ligne de 3
- 1: $0+0+4 \rightarrow 5 \times 3 = 15$
 ou $0+2+2 \rightarrow 5 \times 3 \times \binom{4}{2} = 90$
 ↑
 ligne vide
- 2: $1+1+1 \rightarrow \frac{5 \times 4}{2} \times 3 \times 2 = 60$
- 3: $0+2 \rightarrow \frac{5 \times 4}{2} \times 3 = 30$
- 4: 0
- 5: 1

→ $60 + 15 + 90 + 60 + 30 + 1 = 256$

12



$$a^2 + x^2 = 8^2$$

$$b^2 + x^2 = 6^2$$

$$\rightarrow a^2 - b^2 = 64 - 36 = 28$$

$$= (a+b)(a-b) = 10(a-b)$$

$$a - b = \frac{28}{10}$$

$$a + b = 10$$

$$a = \frac{64}{10} \quad b = \frac{36}{10}$$

$$x^2 = 64 - \frac{4036}{100} = \frac{6400 - 4036}{100} = \frac{2304}{100} = \frac{4}{100} \times 576$$

$$= \frac{16}{100} \times 144$$

$$x = \frac{48}{100} = \frac{12}{25}$$

$$= \frac{24}{5}$$

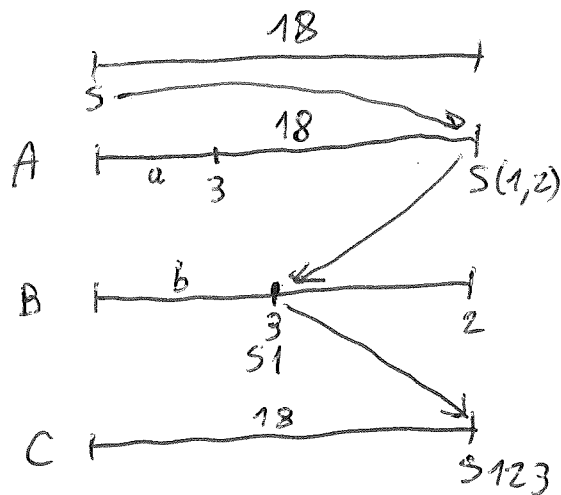
$$5x = \underline{24}$$

~~$$18^2 + 12^2 = 324 + 144 = 468$$~~

$$18^2 + 24^2 = 324 + 576 = 900$$

$$\# 900 / 25 = 36 \quad \text{OK}$$

13



A: $\frac{1}{2} h$, $a = 2 \text{ km}$

B: $18 - 2 = 16 \text{ km}$ à 40 km/h

$$\frac{16}{40} = \frac{2}{5} h \quad b = 2 + 4 \times \frac{2}{5} = \frac{10+8}{5} = \frac{18}{5}$$

Reste: $36 \times \frac{2}{5} = \frac{72}{5}$ ($18 + 72 = 90$)

C: $\frac{72}{5} \text{ km}$ à 36 km/h

$$\frac{72/5}{36} = \frac{2}{5} h$$

$$\frac{1}{2} + \frac{2}{5} + \frac{2}{5} = \frac{13}{10} h = 1 \text{ h } 18$$

(14) $236 = 2$

$123 = 0$

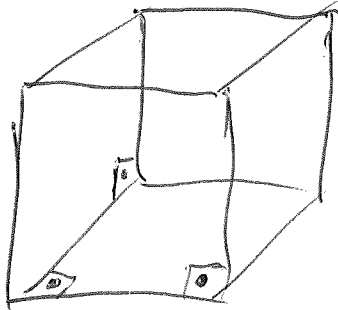
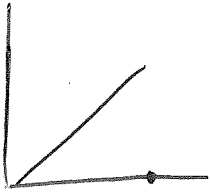
$135 = 1$

$356 = 2$

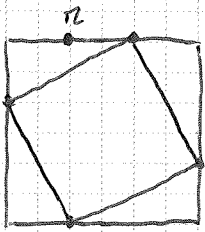
$456 = 4$

$145 = 0$

$\overline{9???$



15



$$S = 1$$

$$S' = 1 - 4 \frac{n(1-n)}{2} = 2n^2 - 2n + 1$$

~~$$S'/S = \frac{2n^2 - 2n + 1}{2n^2 - 2n + 1}$$~~

$$\frac{1}{2} \leq S' < 1$$

~~$$n = p/q$$~~

$$p < q, \quad n \leq \frac{1}{2} \quad \text{i.e. } 2p \leq q$$

$$S' = 2 \frac{p^2}{q^2} - 2 \frac{p}{q} + 1$$

$$S'/S = \frac{2p^2 - 2pq + q^2}{q^2}$$

$$\text{Si } S = 100, \quad S' = 100 \frac{2p^2 - 2pq + q^2}{q^2} \quad q|10$$

~~$$q=4$$~~

- $1/2 : S' = 50$

- $q=5 : \begin{cases} p=1 \\ p=2 \end{cases}$

- $q=10 : \begin{cases} p=1 \\ p=3 \end{cases} \rightarrow S' = 2 - 20 + 100 = 82$

(16)

1: 1

$$x^3 = 4x^2 - 5x + 2$$

2: 14

$$x^3 - 4x^2 + 5x - 2 = 0$$

3: 43

$$(x-1)(x^2 - 3x + 2) = 0$$

4:

$$(x-1)^2(x-2) = 0$$

$$a \cdot 2^n + bn + c$$

1: $2a + b + c = 1$

2: $4a + 2b + c = 14$

3: $8a + 3b + c = 43$

$$2a + b = 13$$

$$4a + b = 29$$

$$2a = 16$$

$$a = 8 \quad b = -3 \quad c = -12$$

$$8 \times 2^n - 3n - 12$$

2012 / 4 = 503 premier

1	2	4	8	16	32	64	128	256	9	18	36	72	144
	288	73	146	292	81	162	324						

$$2^{2012} = (2^{503})^4$$

$$2^{503} \equiv 2 \pmod{503}$$

$$2^{2012} \equiv 2^4 \equiv 16 \pmod{503}$$

$$8 \times 2^{2012} \equiv 128 \pmod{503}$$

$$8 \times 2^{2012} \equiv 128 \pmod{2012}$$

$$128 - 12 = 116$$

$$\textcircled{17} \quad \frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \dots + \frac{1}{2012}$$

$$\frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{2012}$$

geg (2012)

$$\frac{1}{1} + \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{3}} + \frac{1}{\sqrt{4}} + \dots + \frac{1}{\sqrt{2012}}$$

$$f(x) = \frac{1}{\sqrt{x}} = x^{-1/2}$$

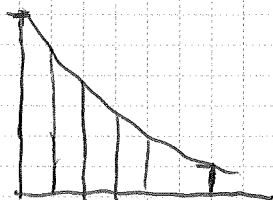
$$F(x) = 2\sqrt{x}$$

$$\sqrt{2012} \approx 44,8$$

$$44^2 = 1936$$

$$45^2 = 2025$$

88?



$$F(2013) - F(2)$$

$$F(2012) - F(1)$$

18

4/21

$$4\sqrt{2} \approx 5,6$$

$$3\sqrt{3} = 5,196$$

$$2,598$$

$$260?$$