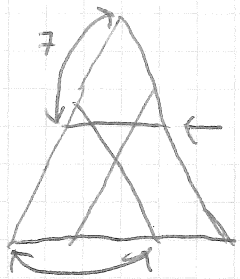
① $25 - 20 = 5 \rightarrow 20 + 10 = 30$

②



$7 + 8 - 1 = 14$

③ "Strictement + d'habitants qui mentent devant moi que d'habitants qui disent la vérité derrière moi."

M ~~M~~ ... ~~V~~ V Le n°1 : M
Le n°9 : V

M M M M M V V V V → 5

④

2 3 4
3 1
2 5

2 3 4
1 2 imp
5

ou

2 3 4
3 1 2 1
4 5 3
non

ou

non
2 3 4
3 4 2 1
1 5 3

Autour de 5 : 1 2 3 4
Autour de 4 : 1 2 3

2 3 4
1 4 1 2
2 5 3

9
8
10
27

⑤

A B C D
5 3 2

~~5+3+2+D | 60~~

~~5+3+4~~

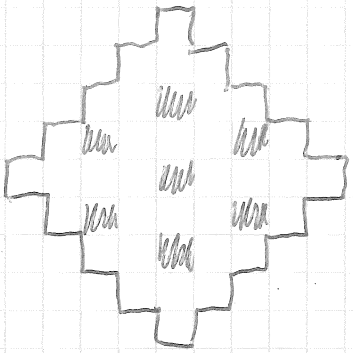
| 2 min de B, C, D, ... | 4' | B 3' C 2'
1' de A

[D 65 min C]

→ 5+3+2+D | 65

→ D = 3

⑥ $2+3+2=7$
↑ col 3 ↑ col 5 ↖ col 7



⑦ 1 semaine = $60 \times 60 \times 24 \times 7$ ㎤
5×12 $2\times3\times10$ 4×6
$8\times9/12 = \boxed{6}\ 8\times9$ → 6 semaines

⑧ imp.

0	1			19
	18	23		
24		20		15
	22			
25				21

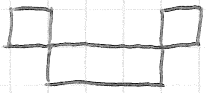
← 18 ← 21

23		1	16	21
	17	22		
	24	13	20	15
		18		
25			14	19

← 21 ← 19

23	6	1	16	21
12	17	22	7	2
5	24	11	20	15
10	13	18	3	8
25	4	9	14	19

⑨ diff = 36 km/h = $\frac{36000\ m}{3600\ s}$ = 10 m/s



20 m → 2 s

⑩ $1/2+1/3+1/4 > 1$ $\quad 180+120+90 = 330$
$\underbrace{1/2+1/3}_{5/6}+1/5 > 1$ $\quad 180+120+72 = 372$

⑪ [1]+[n] → [n+1], [n+2] ... [120]
• n = 4 → 6 façons (1,4)
• (2,3) → 5, 7, 8, 9, 10 ... 120. Restent 1, 4, 6
• (2,4) → 6, 8, 10, 12, ..., 120 ~~Impossible~~ → 6 de la même couleur
• (3,4) ~~Impossible~~. → à voir...
→ 7, 10, 11, 13, 14, 15, 16...
restent 1, 2, 5, ...
↑ ↑ coul ≠

2 coul identiques dans [[1, 4]]
{{2}, {3}, reste} Ⓐ
{{1}, {4}, reste}
6 façons Ⓑ
{{1}, {2}, reste} 6 façons Ⓒ
1 et 3 de coul ≠. 1 pas réutilisé
3+119 OK
2 × 6 façons Ⓓ

→ 30

(12) $p(p-a)(p-b)(p-c)$

$22+x+x$ $\quad p_1 = 11+x$

$120+x+x$ $\quad p_2 = 60+x$

$(11+x)(x-11) \times 11^2 = (60+x)(x-60) \times 60^2$

$x^2 - 11^2 = 60^2$

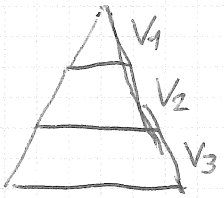
$11^2(x^2-11^2) = 60^2(x^2-60^2)$

$(60^2-11^2)x^2 = 60^4 - 11^4 = (60^2-11^2)(60^2+11^2)$

$x^2 = 60^2 + 11^2 = 3600 + 121 = 3721 = 61^2$ $\quad (121 = 60+61)$

$x = 61$

(13)



$V_2 - V_1$?

$V_1 = \frac{1}{27} V$

$V_1 + V_2 = \frac{8}{27} V$

$V_2 - V_1 = \left(\frac{8}{27} - \frac{2}{27}\right) V$

$\rightarrow V_2 - V_1 = 6 \times 10\,cm^3 = 60\,cm^3$

(14) 7, 14, 21, ..., 49 non

7, 14, 21, 28, 35, 49, 63
↑2 ↑3 ↑2 ↑3

Parmi les 7 divisibles par 7 :
- 2 sont divisibles par 5 : 35 et 70 ?
- 2 sont pairs

~~7 14 21 28 35 49~~

7 14 21 35 49 63 70 | 15 25 45 55 65

↳ 1 div par 3 et 1 non div par 3

4 3 1 0 -1 bon

$4 \times 7 \equiv 6 [11]$ non

7 21 28 35 49 63 70

$6 + 14 = 20 \equiv -2 [11]$ ~~bon~~ ~~45, 25, 65~~ non

7 21 35 42 49 63 70

$-2 + 14 = 12 \equiv 1 [11]$ non

7 21 35 ~~49~~ 56 63 70

$1 + 14 = 15 \equiv 4 [11]$ 15, 25, 55) OK

$(1+3+5+7+8+9+10) \times 7 + 95$

$= 43 \times 7 + 95 = 301 + 95 = \underline{396}$

(15) ℓ, L

$3L + \ell + x = 2L + 3\ell + y = L + 4\ell + 2y$

$\rightarrow y = (2L + 3\ell) - (L + 4\ell) = L - \ell$

Longueur gd rectangle : $2L + 3\ell + L - \ell = 3L + 2\ell$

Largeur " : $2L + \ell$

$L(2L + \ell) = \ell(3L + 2\ell)$

$2L^2 + L\ell = 3L\ell + 2\ell^2 \qquad r = \frac{L}{\ell}$

$2r^2 - 2r - 2 = 0$

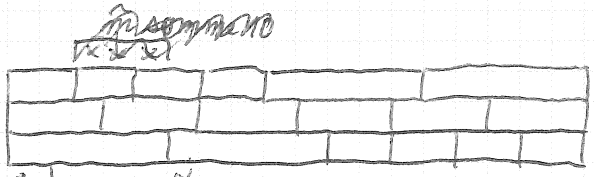
$r^2 - r - 1 = 0 \rightarrow r = \frac{1+\sqrt{5}}{2}$

$(3L + 2\ell)(2L + \ell) - 13L\ell = 6L^2 - 6L\ell + 2\ell^2$

$= (6r^2 - 6r + 2)\ell^2 \qquad r^2 - r = 1$

$= (6 + 2)\ell^2 = 8 \times 15^2\ cm^2 = 1800\ cm^2$

(16) $0 + 1 + 2 \ldots + 9 = 45$ ✗



12 colonnes à 10

(17) $2^n \quad \{n \times \log_{10} 2\} \simeq 0$

$40k + 103l \qquad 40 \times 10 + 103 - 1$?

~~$40 \times 10 + 103 \ell \sim 503\ell$~~

$1,0995^{10} = \left(1 + \frac{1}{10} - \frac{1}{2000}\right)^{10}$

$\simeq 1 + 1 + \frac{45}{100} +$

$2^{10} \to 1,02$

$2^{20} \to 1,05$

$103 \times \log 2 \simeq 31 \times \log 10 + \log 1,01$

entier

~~$\log(1+t) \simeq 1 + t - \frac{1}{2}t^2$~~

(18) $\simeq 1/4\,s$

51?