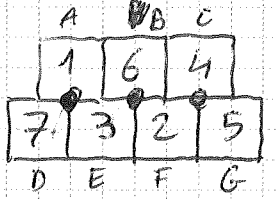
III

① 2102, 2012 | 5105

5105

② 

(2 sol°)

4 ↔ 5

$B = (1+2+\dots+7) - 2\times 11$

$= 28 - 22 = 6$

$E + F = 2+3$

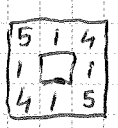
$D + E = 10 \rightarrow E \geq 3 \rightarrow E=3,\ D=7$

$\rightarrow F = 2$

③ 7 virages à droite / tour

$111 = 7t - 1$

$t = \frac{112}{7} = \underline{16}$

④  → 22

⑤ Me : 13

(Je : 1 (matin))

Je : 15

Ve : 4] $+14+4 = +18$

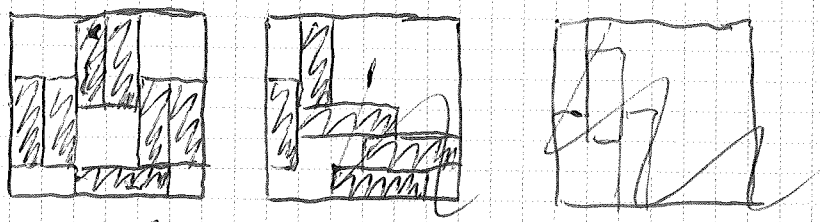
$218 - 18 = \underline{200}$

⑥ $(3n + 792) / 144 - 2 = 10$

$\frac{144\times 12 - 792}{3} = 144\times 4 - 264 = 576 - 264 = \underline{312}$

$312 \ \underline{\times 3} = 936 \ \underline{+792} = 1728 \ \underline{/144} = 12 \ \underline{-2} = 10$

⑦



→ 15?

⑧ ~~9551~~

$533 \times 4 > 2012$

$500 \times 3 + 300 = 1800$

$50 \times 4 = 200$

$3 \times 4 = 12$

```
 5 5 3
+5 5 3
+5 5 3
+3 5 3
=
```

→ 16

40 min.

⑨ 15 nb écrits.

4 ou 5 et des mult. de 5

→ 2 sol°

⑩ $C = ?$ $T = ?$ $R = ?$

$2C + T = 19$

$C + T + R = 15$

$2R + T = 10$

$\rightarrow C - R = 4$

$C - T = 5$

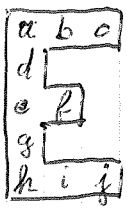
$C = R + 4 = T + 5$

$\rightarrow 3T = 19 - 10 = 9 \rightarrow T = 3$

$\rightarrow C = 8$, $R = 4$

```
8 8 3
8 3 4
4 4 3 → 11
↓
20
```

(1)



$S = a+d+e+g+h \geq 1+2+3+4+6 = 16$

$e+f \geq 16$

$d+g = 55-35 \geq 37$ → $35 \leq 52$ → $S \leq 17$

- Si $S=16$:

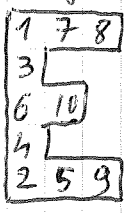
  colonne $= \{1,2,3,4,6\}$, $e+f=16$

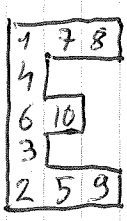
  → $e=6$, $f=10$ $(e<f)$

  $d+g = 7 = 3+4$ (→ 2 sol°)

  → $\{a,h\} = \{1,2\}$

  $hij = 2+5+9$





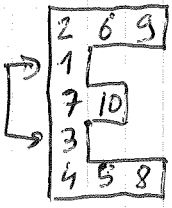
- Si $S=17$:

  $d+g = 4 = 1+3$ (→ 2 sol°)

  $a+d+e+g+h = 1+2+3+4+7$

  → $e=7$, $f=10$

  $hij = 4+5+8$



→ 4 sol°

1b

(12)

1+2+3 → 6
4 à 12 → 6×6
] 42
13 à 21 → 9 + 36 = 45
i××
] 87
22 à 30 → 18+36 = 54
L××
) → 141
31 à 39 → 27+36 = 63
⊔××
) → 204
40 à 48 → 18+36=54
ii××
) → 258
49 à 51 → 12 + 6 = 18 → 276
iLi×
52 à 54 → 15+6 = 21 → 297
iLL×
55 → 7 → 304
iLLi
56 → 8 → 312
iLLL

56

(13) 333
667

$S \equiv 0 \ [9]$
(4+5)

~~1011~~ $1012 = 3 \times 333 + 13$

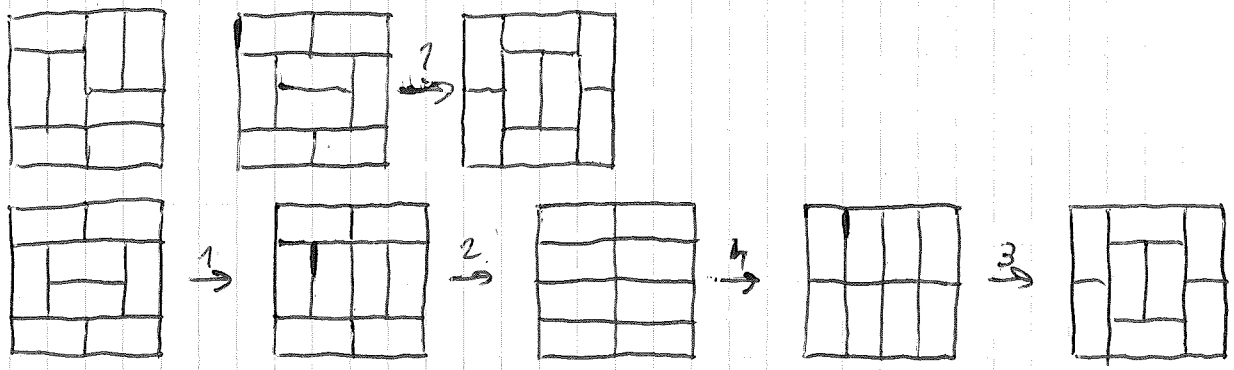
$2012 = 6 \times 333 + 14$

~~4 4 5~~ 4 5 4
~~5 5 4~~ 5 5 4

... 3 3 3 4 5 4
... 6 6 6 5 5 4

→ 9

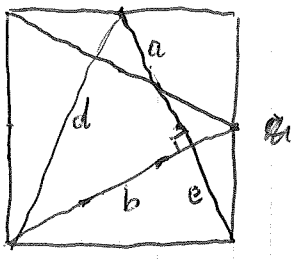
(14)



10 ?

1h30

(15)



côté c.

$d^2 = (c/2)^2 + c^2 = \frac{5c^2}{4}$

$d = c\frac{\sqrt{5}}{2}$

$b^2 + e^2 = c^2$

$e = d - a$

$b^2 + (d-a)^2 = c^2$

$d^2 - a^2 + (d-a)^2 = c^2$

$e \cdot d = \frac{c^2}{2} \rightarrow e = \frac{c^2}{2d} = c\frac{\sqrt{5}}{5}$

$a = d - e = c\left(\frac{\sqrt{5}}{2} - \frac{\sqrt{5}}{5}\right) = c\frac{3\sqrt{5}}{10}$

$b^2 = c^2 - e^2 = c^2\left(1 - \frac{1}{5}\right) = \frac{4}{5}c^2$

$= d^2 - a^2 = c^2\left(\frac{5}{4} - \frac{45}{100}\right) =$ "

$b = c\frac{2\sqrt{5}}{5}$

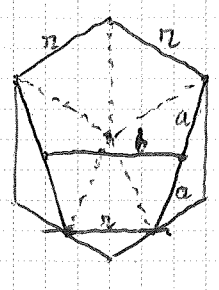
$d/a = \frac{1}{2} \times \frac{10}{3} = 5/3$

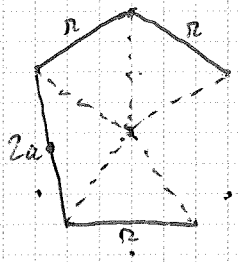
$d/b = \frac{1}{2} \times \frac{5}{2} = 5/4$

$a = 3, b = 4, d = 5$

$c^2 = \frac{4}{5}d^2 = \underline{20}$

(16)





$h = \frac{r\sqrt{3}}{2}$

$4a^2 = \left(h - \frac{r}{2}\right)^2 + \left(h + \frac{r}{2}\right)^2 = 2h^2 + \frac{r^2}{2}$

$= r^2\left(\frac{3}{2} + \frac{1}{2}\right) = 2r^2$

$\rightarrow a = r\frac{\sqrt{2}}{2}$

$b = \frac{2h + r}{2} = \frac{r}{2}(\sqrt{3}+1)$

$H = \frac{r}{2} + \frac{1}{2}\left(\frac{r}{2} + h\right) = \frac{3r}{4} + \frac{h}{2}$

$\frac{b \cdot H}{2} = \frac{1}{2}\left(\frac{2h+r}{2}\right)\left(\frac{3r}{4}\right)$

$= \frac{1}{2}\left(\frac{r}{2}(\sqrt{3}+1)\right)\left(\frac{r}{4}(3+\sqrt{3})\right)$

$= \frac{r^2}{16}(\sqrt{3}+1)(3+\sqrt{3}) = \frac{r^2}{16}(6+4\sqrt{3})$

$= \frac{r^2}{8}(3+2\sqrt{3})$

$2\sqrt{3} \simeq 3{,}464 \qquad 3+2\sqrt{3} \simeq 6{,}464$

$\frac{3+2\sqrt{3}}{8} \simeq 0{,}808$

$A \simeq 25^2 \times 0{,}808 = 5000 \times 0{,}101 = \underline{505}$

(17)

0012
1012
2012
1012

1012... : 1/27

$\frac{26}{27} \times \frac{1}{3}$ $\frac{26}{81}$?

012 → P (1/27)
x012 → P
xx012 →

$\frac{3}{78} = \frac{1}{26}$

$\frac{1}{3}\left(\frac{1}{26} + \right.$

P(012) = 0
P(xx2) = 1/27 (8 pom.) → 8/27
P(xx0)

012	1/27
0012	1/81
1012	1/81
2012	1/81

1/81+

.x012
..x012
012

$\frac{1}{3^3} - \frac{1}{3^6} + \frac{1}{3^5} - \ldots$?

$\frac{27}{28} \times \frac{1}{3} = \frac{9}{28}$?

(18)

N = 1 : 1

2 : 1 2

3 : 1 2 3

4 : 1 4 2 3

5 : 1 4 3 5 2

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

$3k+1$ éliminées. ... $\times 1$

1, 4, 7, ..., 2011

3, 8, 12, 17, 21 ... $9k+3$ et $9k+8$

Restent : $9k + \{2, 5, 6, 9\}$ $2012 \equiv 5 [9]$

$2007/3 = 223$

5, 11, 18, 24, 32 $2012 \equiv 14 [27]$

Restent : $27k + \{2, 6, 9, 14, 15, 20, 23\}$

$81k + \{2\ 6\ 9\ 14\ 15\ 20\ 23\ 29\ 33\ 36\ 41\ 42\ 47\ 50\ 56\ 60\ 63$

$68\ 69\ 74\ 77\}$

$2012 = 81 \times 24 + 68$