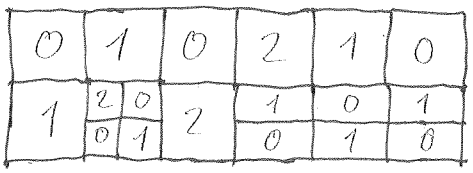
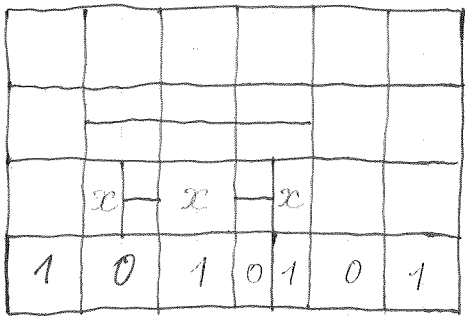
(7)





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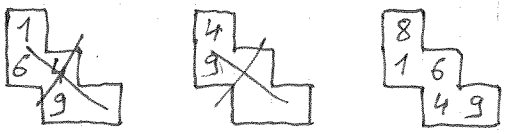
(8) T 1 ... 29 T
5 25 → 15
10 20

---

(9)



16
25 27
36
49
64
81

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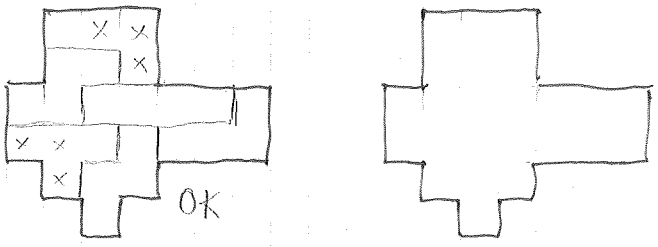
(10)



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(11)

~~1+23+456~~
~~1+24+356~~
381-345=36

381 = 356 + 24 + 1
372 = 356 + 12 + 4
372 = 356 + 14 + 2

291 = 256 + 34 + (1)
~~245+3+~~
~~246+~~
234 + 56 + 1

273 = 256 + 13 + 4
256 + 14 + 3
~~234~~

192 - 34 = 158 = 156 + 2

(12)

123 → P

12 → P

23 → G

34 → P

1 → 3 → P

2 → 3 → P

3 → 2 → P

4 → 123 → P

5 → 123 → P

---

(13)

0 → 1 : 4 ← 4e

1 → 2 : 5

2 → 3 : 2

3 → 4 : 3

4 → 5 : 3

5 → 6 : 1

6 → 7 : 5

7 → 8 : 4 ← 1er

8 → 9 : 1 ← 2e

9 → 0 : 2 ← 3e 09:59 → 10:00 ou ...

59 → 00 : 3 + 2 = 5

9 → 0 : 2 reste 4 pour 0 → 1

23 → 00 : 3 + 3 = 6

10:02 ou 00:02

(14) a et b

$\frac{(a+b)(a+b-1)}{2}$

$\frac{n(n-1)}{2}$ $\quad$ $\frac{b(b-1)}{2}$

2 3 4

1 3 6 10 15 21 28 35 45 55 66 78 91 105 120
136 153 171 190 210 231 253 276 300

6 → $n=4$
210 → $n=21$

---

(15)

1 → 1
2 → 1
3 → 231 → 31 → 13 → 3
4 → 2341 → 341 → 13 → 1
5 → 12345 → 135 → 35 → 3
6 → 135 → 5
7 → 1357 → 37 → 7

1 → 1
2 → 3
3 → 5

$f(2n) = 2f(n) - 1$
$f(2n+1) =$

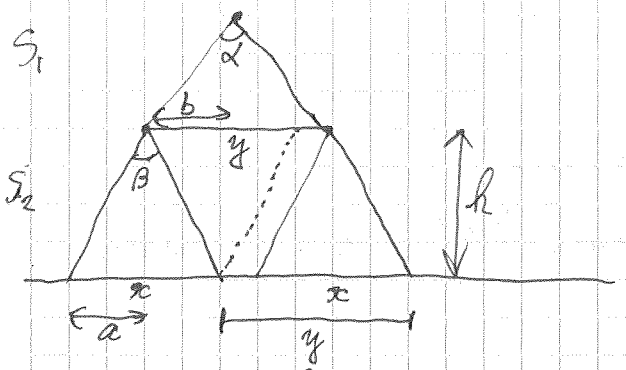
24 → 1 3 5 ... 23
→ 1 5 9 ... 21 → n

8 → 1357 → 15 → 1
9 → 913579 → 3
10 → 13579 → 5

$2^n + \frac{17-1}{2} = 2^n + 8$

$n=4$ → 24
$n=5$ → 40
$n=6$ → 72

(16)



$h = \cos(\beta/2)$

$a = \sin(\beta/2)$

$$S_2 = \frac{xh}{2} + yh = h\left(\frac{x}{2} + y\right)$$

$$h^2 + \left(\frac{x}{2}\right)^2 = 1$$

$$S = \sqrt{1-a^2}\,(a+2b) + b\sqrt{1-b^2}$$

$$S = \frac{\sin\alpha}{2} + \frac{\sin\beta}{2} + 2\cos(\beta/2)\cdot\sin(\alpha/2)$$

$$\frac{dS}{d\alpha} = \frac{\cos\alpha}{2} + \cos(\beta/2)\cdot\cos(\alpha/2)$$

$$\frac{dS}{d\beta} = \frac{\cos\beta}{2} - \sin(\alpha/2)\cdot\sin(\beta/2)$$

$$\frac{dS}{da} = \frac{-2a}{2\sqrt{1-a^2}}(a+2b) + \sqrt{1-a^2}$$

$$= \frac{1-2a^2-2ab}{\sqrt{\dots}}$$

$$1-2a^2-2ab = 0$$

$$b = \frac{1-2a^2}{2a} = \frac{1}{2a} - a$$

$$b^2 = \frac{1}{4a^2} - 1 + a^2$$

$$\frac{dS}{db} = 2\sqrt{1-a^2} + \frac{1-2b^2}{\sqrt{1-b^2}}$$

$$= 2\sqrt{1-a^2} + \frac{3 - 1/(4a^2) - a^2}{\sqrt{2 - 1/(4a^2) - a^2}}$$

$A = a^2$

$2(1-A) =$

$\sin\alpha + \sin\beta$

$+ \frac{\sin\beta}{2}$

$+2\cos(\beta/2)\left[\sin(\alpha/2) - \sin(\beta/2)\right]$

$= \frac{\sin\alpha}{2} + \frac{\sin\beta}{2}$

$+ 2\cos(\beta/2)\cdot\sin(\alpha/2)$

$\cos^2\alpha' - \frac{1}{2} + \cos\alpha' \cdot \cos\beta' = 0$ $\qquad \cos\beta' = \frac{1/2 - \cos^2\alpha'}{\cos\alpha'} \qquad \cos^2\alpha' = x$

$\cos^2\beta' - \frac{1}{2} - \sin\alpha' \cdot \sin\beta' = 0$ $\qquad \cos^2\beta' = \frac{1}{4\cos^2\alpha'} - 1 + \cos^2\alpha'$

$= \frac{1}{4x} - 1 + x$

$\left(\frac{1}{4x} - 1 + x - \frac{1}{2}\right)^2 = (1-x)\left(1 - \frac{1}{4x} - x\right)$

$\frac{1}{16x^2} + \frac{1}{4} + x^2 + \frac{1}{2} - \frac{3}{4x} - 3x$

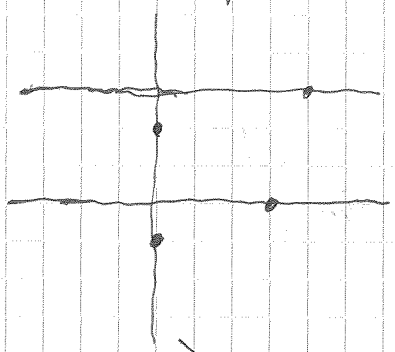
$= \frac{1}{4x} + 2 + x^2 - 3x$

$\frac{1}{2} - \frac{1}{x} + \frac{1}{16x^2} = 0$

$x^2 - 2x + \frac{1}{8} = 0$

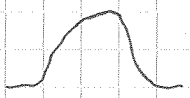
$x = -1 \pm \sqrt{1 - \frac{1}{8}}$

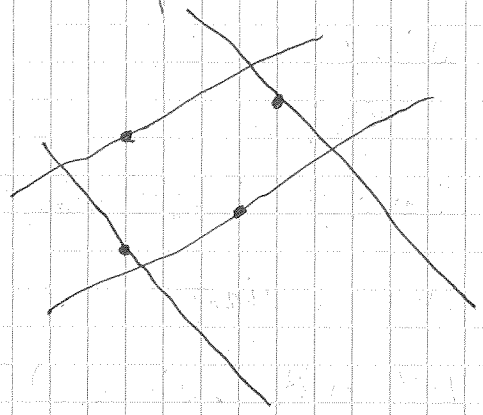
(18) Pas d'align. de 3 pts, pas de //

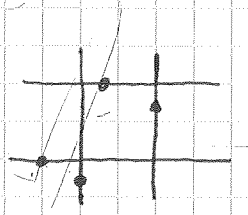


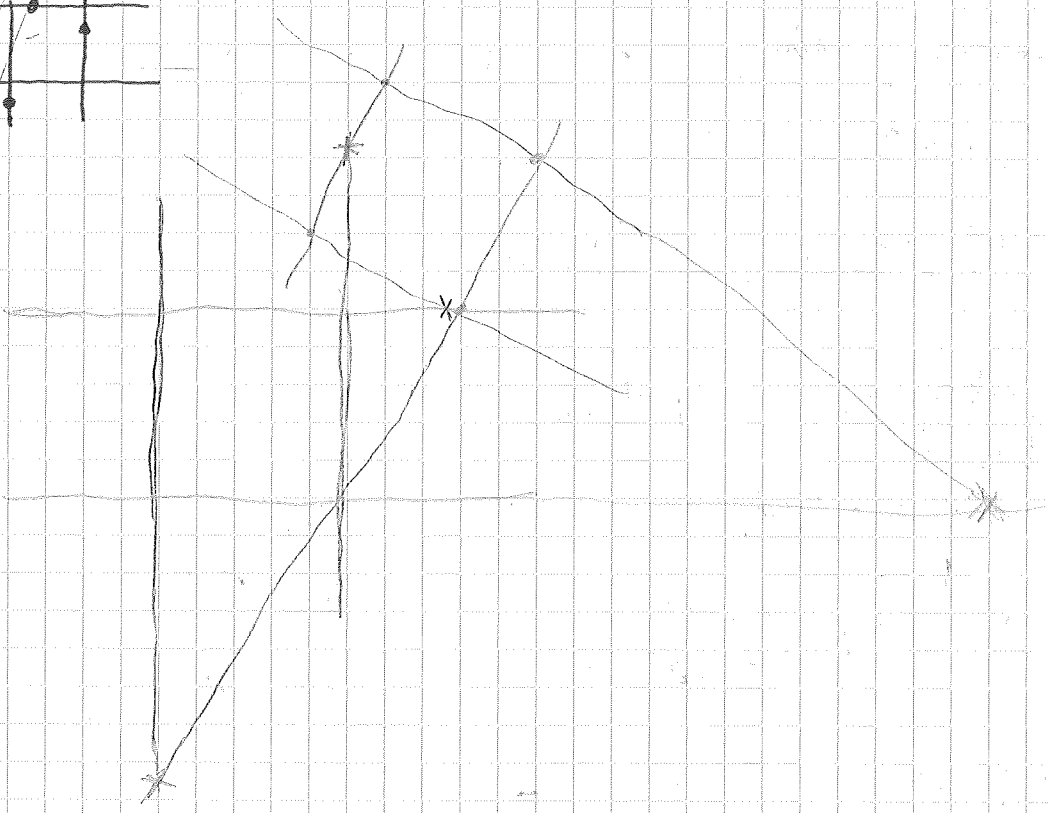
→ 2 carrés.

→ au total : $\frac{4 \times 3}{2} \times 2 = 12$ carrés.









≥ 14