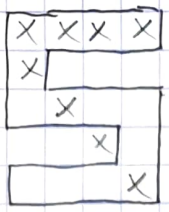
(1)



$\rightarrow \underline{\underline{7}}$

(2) $-15 \quad 0 \quad +5 \quad +10$

$\longleftrightarrow$ 25

09h50 10h15

$\rightarrow$ 10h05

(3) $1+32$ à $16+17$

$\rightarrow 16$

(4) $3+1 = 4$

$7+4 = \underline{\underline{11}}$

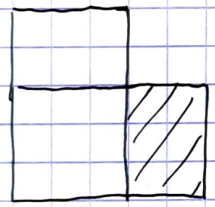
(5) $1+2+\ldots+8 = 36$

col : $36/4 = 9$

1 4 7 6

8 5 2 3 $\rightarrow 5$

(6)



$17 \times (20-17) = 51$

(7) $100a = 80b$

$b - a = 50g$

$5a = 4b \qquad b = a + 50$

$5a = 4a + 200$

$a = 200g = 0{,}2\,kg$

$100a = \underline{20\,kg}$

(8) $AA \times BB = CCDD$

$11\,ab = 100c + d$

$11 \times 19 = 209$

$11 \times 28 = 308$

$44 \times 77 = \underline{3388}$

(9) $\left.\begin{array}{l} n \equiv 1\,[12] \\ n \equiv 1\,[14] \end{array}\right\} \rightarrow n \equiv 1\,[84]$

$n = 85$ ou 169 2 sol°

(10) nb diag : $N = \dfrac{n(n-3)}{2}$

nb diag adjacentes : $2(n-4)$

$\rightarrow \dfrac{N(N-2(n-4)-1)}{2}$

$\cancel{+\frac{1}{8}n(n-3)(n(n-3))}$

$n = 7 \rightarrow N = 14$

$\rightarrow \dfrac{14}{2}(14-7) = \underline{\underline{49}}$

(11) $365 \equiv 1\,[7] \qquad (A \rightarrow A+4) \rightarrow +5$ jours

tous les $4 \times 7 = 28$ ans

2048, 2076 2 sol°

(12) $1+3+5+11$ non

$1+3+7+9$

$1+4+6+9$

$2+4+6+8$

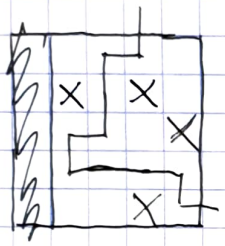
3 sol°

(13) $6+6+8$, $7+7+6$, $8+8+4$, $9+9+2$ $\rightarrow$ 4

(14) 10 cases $\quad 2020-70=1950$

$18a+20b+23c=195 \qquad a+b+c=10 \quad b\geq 1 \quad c\geq 1$

$a+c\equiv 0\ [5] \rightarrow b=5 \rightarrow a=4$ et $c=1$



(15) $\binom{10}{5} / 2^{10}$

$\dfrac{10\times 9\times 8\times 7\times \cancel{6}}{5\times 4\times 3\times \cancel{2}} = 2\times 9\times 2\times 7 \cancel{\ 256}$

$\rightarrow 63/256$

(16) $2020-63-77-99-239=1880-99-239=1542$

$1542/2=771 \qquad 3\times 239=717$ impass.

$771\equiv 1\ [11] \qquad 63\equiv \underset{8}{-3}\ [11] \qquad 239\equiv \underset{8}{-3}\ [11]$

$7\times 8\equiv 1\ [11]$

$\cancel{7\times 63=504 \quad 771-504=267}$ $\qquad (15,7,3,1)$

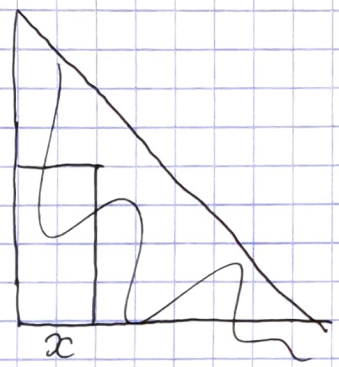
$7\times 63=441 \qquad 771-441=330=3\times 77+99$

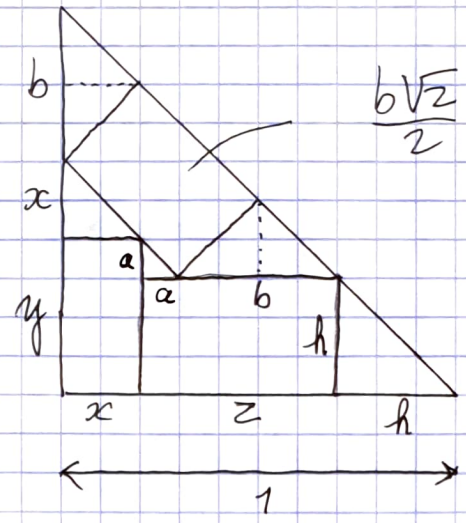
$6\times 63+239=617 \qquad 771-617=154=2\times 77 \rightarrow (13,5,1,3)$

$5\times 63+2\times 239=\cancel{717} > 771$

2 sol°

17





$$\frac{b\sqrt{2}}{2} \times (a+x)\sqrt{2} = (1-x-y)(2x+y+z-1)$$

$$h = 1-x-z$$

$$a = y - h = x+y+z-1$$

$$b = z - a = 1-x-y \qquad 4\left(\frac{b}{2}\right)^2 = b^2$$

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

$$\frac{1}{2}\left((1-x-z)^2 + (x+y+z-1)^2 + x^2 + (1-x-y)^2\right)$$

$$\frac{1}{2}\left(3 + 4x^2 + 2y^2 + 2z^2 + \right.$$

$$xy + z(1-x-z) + (1-x-y)(2x+y+z-1)$$

$$= xy + z - zx - z^2 - 1 + 3x + 2y + z - 2z^2 - y^2$$

$$-3xy - xz - yz$$

$$\frac{d-}{dz} = 1 - x - 2z + 1 - x - y = 0 \rightarrow 2x + y + 2z = 2 \quad A$$

$$\frac{d-}{dx} = y - z - y - z + 1 + 2 - 2y - 4x = 0 \rightarrow 4x + 2y + 2z = 3 \quad B$$

$$\frac{d-}{dy} = x + 1 - x - 2x - z + 1 - 2y = 0 \rightarrow 2x + 2y + z = 2 \quad C$$

$$B - 2C \rightarrow 2y = 1 \rightarrow y = 1/2$$

$$B - A \rightarrow 2x + 1/2 = 1 \rightarrow x = 1/4$$

$$z = 2 - 1/2 - 1 = 1/2$$

$$\rightarrow h = 1/4$$

$$\rightarrow 1/2 - (1/8 + 1/8 + (1/4)\times(1/2)) = 1/8 = S/4$$

$$2020/4 = \underline{505}$$

(18) $24^2 = 576 \rightarrow 676 = 26^2$

$45^2 = 2025 \rightarrow 3025 \quad 605 \quad 121 \rightarrow 55^2$

$95^2 = \cancel{9125} \rightarrow \cancel{27125} \quad \cancel{5425} \quad \cancel{1085}$

$9025 \rightarrow 25$

$676 - 576 = 100 = (26+24)(26-24)$

$3025 - 2025 = 1000 = (55+45)(55-45)$

240
450
950
495
105
585

6 sol° ?

$10^4 < xxx^2 < 10^6$

495 et 505 $\longrightarrow$ OK

$10\,000 = 1000 \times 10 \rightarrow$ ~~995 et 1005 non~~

$= 625 \times 16$ imp. (parité)

$= 500 \times 20$ cf 24^2 (240) $\rightarrow$ OK

$= 250 \times 40 \rightarrow 105$ et $145 \rightarrow$ OK

$= 200 \times 50 \rightarrow$ imp.

$100\,000 = 2000 \times 500 \rightarrow$ imp.

$= 2500 \times 400 \rightarrow 1050$ et 1450 imp.

$= 1000 \times 100 \rightarrow 450$ et 550 (cf 45)

$= 1250 \times 80 \rightarrow 585$ et $665 \rightarrow$ OK

$1000000 = 1000 \times 1000$

$= \cancel{2000 \times}$