

①

④

$$6 = 1 \times 6 = 2 \times 3$$

$$\textcircled{5} + \textcircled{1}$$

$$\textcircled{2} \times \textcircled{3}$$

⑥

②

$$M \downarrow V M V M \rightarrow 3$$

③ T tables, C chaises

$$4T = C + 3$$

$$T = 10 \quad C = 37$$

$$6 \times 5 = 30 \rightarrow 7$$

④ somme = 3

$$A/2 \quad \textcircled{B}/0 \quad C/1$$

$$A/0 \quad \textcircled{B}/1 \quad \textcircled{C}/2$$

$$A/2 \quad \textcircled{B}/1 \quad \cancel{C/0}$$

⑤ 6n ~~AAA~~

$$2 \rightarrow 4 \times 3$$

$$\rightarrow 12 \times 12$$

$$12 \times 12 / 6 = \underline{\underline{24}}$$

$$\textcircled{6} 4 \times 3 = 12$$

$$2017 + 12 = 2029$$

$$\textcircled{7} M = J + 3$$

$$J = M - 3$$

$$F + F + J + M = 2F + 2M - 3 = 35$$

$$2(F + M) = 38 \rightarrow \underline{\underline{19}}$$

$$\textcircled{8} 17 = 8 + 9$$

$$20 = 9 + 11$$

$$\rightarrow \underline{\underline{9}}$$

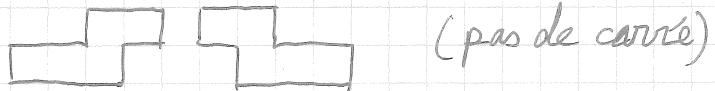
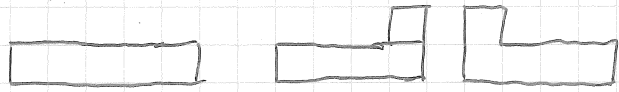
⑨

$$p^1 q^2$$

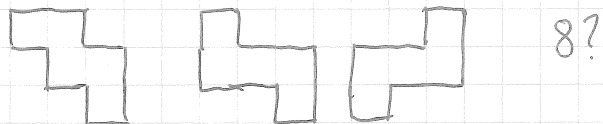
$$72 = 2^3 \times 3^2 \rightarrow p = 3, q = 2$$

Agathe: 12 ans

⑩



(pas de carré)



8?

⑪

$2017 \equiv 1 [9] \rightarrow 8$ non utilisé.

$$a(a+b)b \text{ ou } a(a+b-1)b$$

12

$$27 = 18 + 9$$

$$\circ 18 + 6 + 3 \quad 18 + 6 + 2 + 1$$

$$21 + 6$$

$$14 + 7 + 6$$

$$14 + 7 + 4 + 2$$

$$18 + 7 + 2$$

$$12 + 7 + 6 + 2$$

$$8 + 7 + 6 + 4 + 2 \rightarrow OK$$

$$12 + 7 + 4 + 2 + 2$$

$$~~12 + 9 + 4 + 2~~ \quad 12 +$$

$$~~7 + 6 + 4 + 3 + 2 + 2~~
~~7 + 4 + 4 + 3 + 2 + 2 + 2~~$$

$$8 + 7 + 4 + 4 + 2 + 2$$

$$8 + 7 + 6 + 4 + 2$$

$$12 + 7 + 4 + 2 + 2$$

$$18 + 9 = 12 + 9 + 6 = 9 + 8 + 6 + 4 = 8 + 6 + 6 + 4 + 3$$

$$= 8 + 4 + 4 + 4 + 3 + 2 + 2$$

$$= 8 + 4 + 4 + 4 + 2 + 2 + 2 + 1$$

$$= 8 + 4 + 4 + 4 + 3 + 2 + 2$$

$$= 8 + 7 + 4 + 4 + 2 + 2$$

$$= 9 + 4 + 4 + 4 + 2 + 2 + 2$$

$$= 6 + 4 + 4 + 4 + 3 + 2 + 2 + 2$$

$$= 4 + 4 + 4 + 4 + 2 + 2 + 2 + 2 + 2 + 1$$

$$= 7 + 4 + 4 + 4 + 2 + 2 + 2 + 2$$

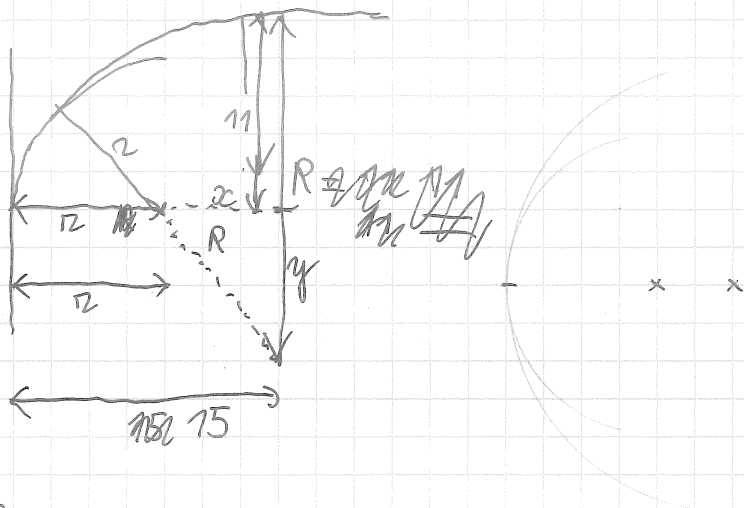
$$= (7 + 4 + 2) + (4 + 4 + 2 + 2 + 2)$$

7 send nb impair.

↳ 2 nb

$$\rightarrow \underline{\underline{8}}$$

13



$$R > 11$$

$$y = R - 11$$

$$x = 15 - r$$

$$x^2 + y^2 = (R - r)^2$$

$$R^2 - 22R + 121 + r^2 - 30r + 225 = R^2 - 2Rr + r^2$$

$$346 - 22R - 30r + 2Rr = 0$$

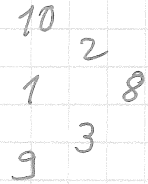
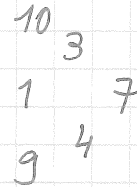
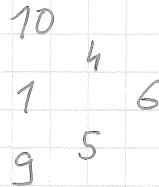
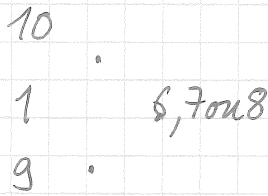
$$r = 10$$

$$R = \frac{346 - 300}{22 - 20} = \frac{46}{2} = \underline{\underline{23}}$$

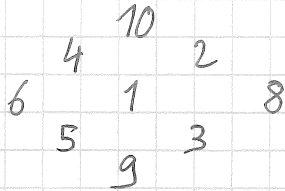
14) $20 = 9 + 8 + 3 = 8 + 7 + 5 = 10 + 9 + 1$
 $= 9 + 7 + 4 = 10 + 8 + 2$
 $= 9 + 6 + 5 = 10 + 7 + 3$
 $= 10 + 6 + 4$

2 sommets : 3 sommes. $\rightarrow 7 \geq 10$

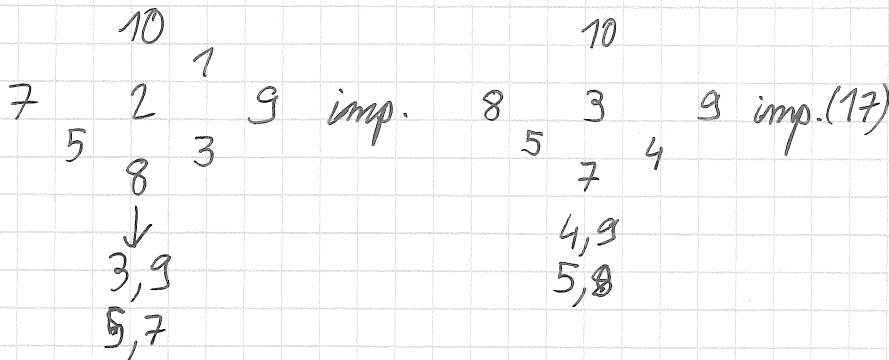
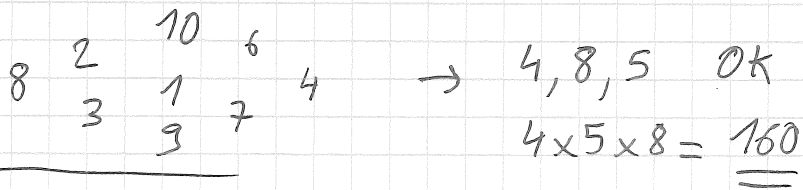
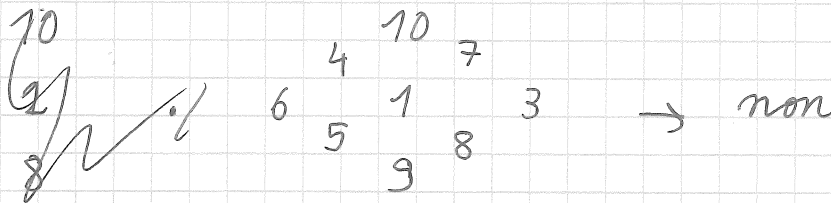
une somme commune



\rightarrow 6 et 8



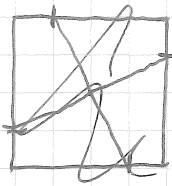
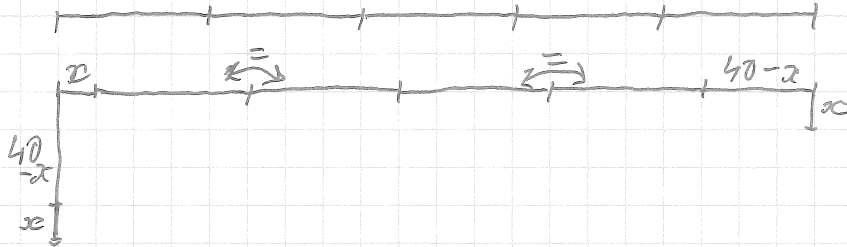
$6 \times 8 \times 7 = 48 \times 7 = \underline{\underline{336}}$



14 suite

9		9	8
3		4	5
8		7	7
2, 10	imp (17)	→ 8 et 10 imp.	imp.
5, 7			

15



H et h

$$\left. \begin{aligned} &(hx - h(40-x)) \times 2 \\ &+ (H(40-x) - Hx) \times 2 \end{aligned} \right) / 2$$

$$2 \times [2hx - 40h - 2Hx + 40H]$$

$$H = 100 \quad h = 60$$

$$Q(120x - 2400 - 200x + 4000)$$

$$= Q(1600 - 80x) = \frac{1}{100} 200 \times \frac{120}{2} = 140 \cdot 120$$

$$1600 - 80x = 120$$

$$80x = 1480 \quad x = 1480/8 = 37/2 = 18,5$$

$$40 - 18,5 = \underline{\underline{21,5}}$$

$$x \times 2$$

$$40 - 37 = \underline{\underline{3}}$$

$$80x =$$

$$\frac{1600 - 80x}{2} = 240$$

$$80x = 1220$$

OK

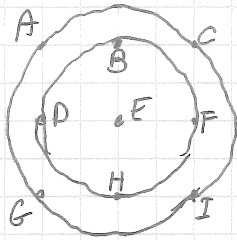
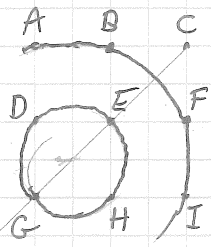
17

41 43 47 53 61 71 83 97 103 ~~113~~
113

113

$$41 + k + k^2 \quad k \leq 40 \quad k \leq 39$$

~~113~~ 1 to 39 \rightarrow 39?



~~D+E → A~~

$A + D \rightarrow ACDF \quad (1)$

$A + E \rightarrow (1)$

$A + G \rightarrow ACGI \quad (1)$

$A + H \rightarrow (1)$

$B + D \rightarrow BCDG \quad (1)$

$B + E \rightarrow BCEF \quad (1)$

$D + E \rightarrow (1)$

$D + H \rightarrow (1)$

$D + I \rightarrow (1)$

$E + H \rightarrow (1)$

$E + I \rightarrow (1)$

$F + G \rightarrow CFGH \quad (1)$

$G + \text{fin} \rightarrow \underline{\underline{12}}$

$A + B \rightarrow ABDE \times 4$

$A + C \rightarrow (1) \times 4$

$A + F \rightarrow (1) \times 8$

$B + \text{fin} \rightarrow \underline{\underline{16}}$