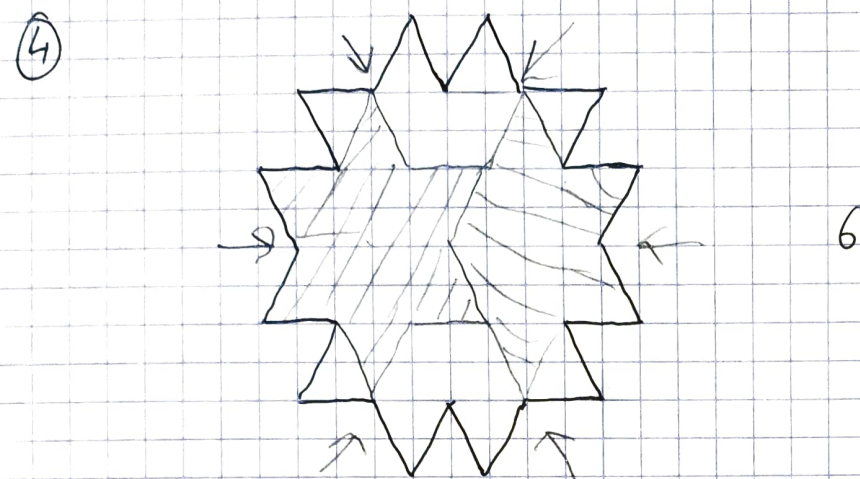


①  $C < A < D < E < B \rightarrow \underline{D}$

②  $2+2, 2+1+1, 1+2+1, 1+1+2, 1+1+1+1 \rightarrow 5$

③  $10A + B = 2A + 2B \quad B = 8A \rightarrow 18$



⑤  $1B \xrightarrow{(+1)} 2R \quad 1R \xrightarrow{(+2)} 3B$

$+14 : 6(+1) + 4(+2)$

$6R \rightarrow 2R + 12B \rightarrow 6B + 14R \rightarrow 6$

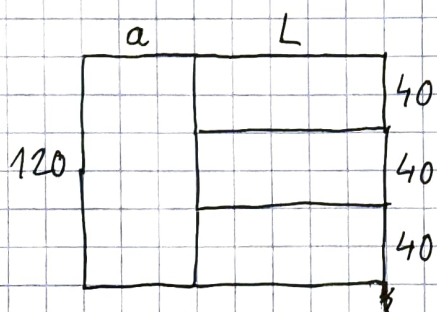
⑥  $nF + nG \quad n \leq 15 \quad 2|n$

$(n/2)F + (n+1)G$

$5 | (n/2) + n + 1 \quad n = 2k \quad 5 | 3k + 1 \quad k = 3 \rightarrow n = 6$

$3F + 7G \rightarrow 10 - 2 = \underline{\underline{8}}$

⑦  ~~$l = 40 \quad L = 180 - 40 = 140 \quad 2a$~~



$40L = 120a \quad L = 3a$

$L + a = 180 \quad 4a = 180 \quad a = 45$

$L = 180 - 45 = \underline{\underline{135}}$

$$\textcircled{8} \quad 1+2+\dots+6 = 21 \quad 21-6 = 15$$

$a$ : sur arête       $s$ : sur sommet

$$\left. \begin{array}{l} 2a + 3s = 15 \\ a + s = 6 \end{array} \right) s = 15 - 2 \times 6 = \underline{\underline{3}}$$

$$\textcircled{9} \quad \text{PPCM} \leq 80 \quad \exists nb \geq 9$$

$$35 - 1 - 2 - 3 - 4 = 25 \quad (\rightarrow \rightarrow 80) \quad 24 \text{ non} \quad 23 \text{ non}$$

$$22: \text{ reste } 13 \quad 6+3+2+ \text{ imp.}$$

$$21: \text{ reste } 14 \quad 7 \ 3 \ 1 \quad - \quad \begin{array}{l} 2 \ 6 \ \text{imp.} \\ 3 \ \text{imp.} \end{array}$$

$$20: \text{ reste } 15 \quad 1 \ 2 \ 4 \ 5 \ 10 \quad - \quad 8 \quad 1+2+4+8 \rightarrow 40$$

$$18: \text{ reste } 17 \quad 1 \ 2 \ 3 \ 6 \ 9 \quad - \quad 4 \ 12 \quad 1+3+4+9 \rightarrow 36$$

$$15: \text{ reste } 20 \quad 1 \ 4 \ 3 \ 5 \quad - \quad 2 \ 6 \ 10 \quad 1+3+6+10 \rightarrow \underline{\underline{30}}$$

$$12: \text{ reste } 23 \quad 1 \ 2 \ 3 \ 4 \ 6 \quad - \quad 8 \quad \text{imp.}$$

$$\textcircled{10} \quad 855 \quad 553 \quad \del{535} \quad 533$$

$$3u + 5(7-u) \equiv 1 \pmod{10} \rightarrow u = 2 \text{ ou } 7$$

$$7 \text{ impossible (7 nb distincts)} \rightarrow u = 2 \quad (\text{chiffres } 3 \text{ pour unités})$$

$$2 \times 3 + 5 \times 5 = 31 \quad 2021 - 31 = 1990$$

$$3d + 5(7-d) \equiv 9 \pmod{10} \rightarrow d = 3 \quad (\text{chiffres } 3 \text{ pour dizaines})$$

$$3 \times 3 + 4 \times 5 = 29 \quad 199 - 29 = 170$$

$$17 = 5 + 3 + 3 + 3 + 3 \rightarrow 4 \text{ chiffres } 3$$

$$\rightarrow 2 + 3 + 4 = \underline{\underline{9}}$$

11

101 : 10 11

12 15 ... 99 (100) (101) (102) ... (131) ... (999)  
                        ↳ 2<sup>e</sup>   ↳ 2<sup>e</sup>

(100) or

1000	1001	1002	1003	1004	1005	...	1008
1009	1010	1011	1012	1013	1014	1015	→ 3
	↳ 3 <sup>e</sup>		↳ 4 <sup>e</sup>		↳ 3 <sup>e</sup>	↳ 5 <sup>e</sup>	

12

<del>1000</del>	<del>1331</del>	<del>2197</del>						144 × 12		169 × 13
								1440 + 288		
1000	1331	1728	2197	2744	3375	4096		4096		1690 ✓
331	397	469	547	631	721	817				
66	72	78	84	90	96	102				
	6	6	6	6	6	6				
4096	4913	5832	6859	<del>8000</del>	9261					
817	919	1027	1141	1261						
102	108	114	120							
	6	6	6							

1331 OK

1728 → non

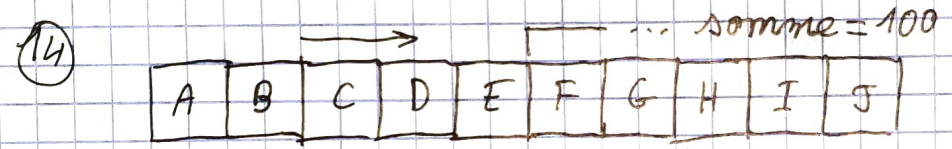
2197 → non

2744 → 4096 → 6859 → 9261 non

→ 4913 → 3375 → 5832 → 2744 OK

2 sol<sup>o</sup> : 1331 et 2744

13)  $a, b, c$   ~~$v = abc = 1000$~~   
 $3ab = 4bc = 5ca = abc - 6000$   
 ~~$3a = 4b$~~   $(3, 4, 5)k$   
 $3 \times 4 \times 5 k^2 = 3 \times 4 \times 5 k^3 - 6000$   
 ~~$3k^2 = 3k^3 - 6000$~~   
 ~~$3k^3 = 3k^2$~~   $k^2 = k^3 - 100$   
 $k^3 - k^2 = 100 \rightarrow k=5 \text{ sol}^\circ$   
 $k^3 - k^2 = k^2(k-1) \nearrow 1 \text{ solution}$   
 $3 \times 4 \times 5 \times 5^3 = 3 \times 25 \times 100 = \underline{\underline{7500}}$

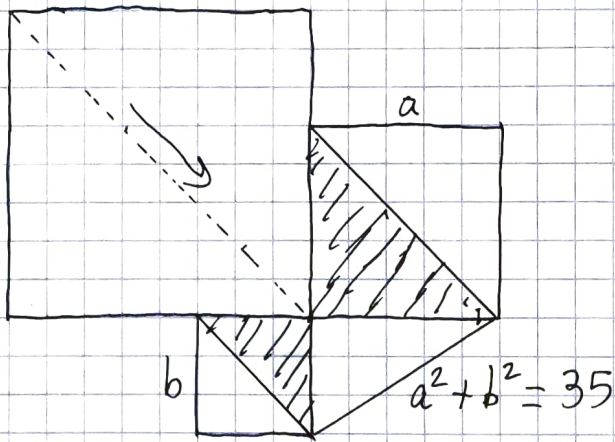


$A - F = 900$   
 $B - G = 9000$   
 $C - H = 90000$   
 $D - I = 900000$   
 $E - J = 9000000$   
 $100 + 9999900 + F + G + H + I + J$

$10^7 \rightarrow + \text{gd multiple de } 35 \leq 10^7 + 100$   
 $\hookrightarrow \text{de } 7$

$10^7 \equiv 10 \pmod{7}$   
 $10^7 + 100 \equiv 110 \equiv 5 \pmod{7}$   
 $\rightarrow 10^7 + 95 = 10'000'095$

15



$$S = \frac{1}{2} (a^2 + b^2)$$

$$= 35/2$$

$$= 17,5 \text{ cm}^2 = \underline{\underline{1750 \text{ mm}^2}}$$

$$16) \frac{N(N-1)}{2} = (N+1) + (N+2) + \dots + (N+k) = kN + \frac{k(k+1)}{2}$$

$$N^2 - N = 2kN + k(k+1)$$

$$N^2 - (2k+1)N - k(k+1) = 0$$

$$\Delta = (2k+1)^2 + 4k(k+1) = 8k^2 + 8k + 1$$

$$k^2 + (2N+1)k - N(N-1) = 0$$

$$\Delta = (2N+1)^2 + 4N(N-1) = 8N^2 + 1$$

$$N = 0, 1, 6, 35$$

$$35 \times 6 - 6 = ? \quad \underline{\underline{204}}$$

$$17) 1 + 10^{-1} + 2 \times 10^{-2} + 3 \times 10^{-3} + 5 \times 10^{-4} + \dots$$

$$(4^n / \sqrt{5}) \times 10^{-n}$$