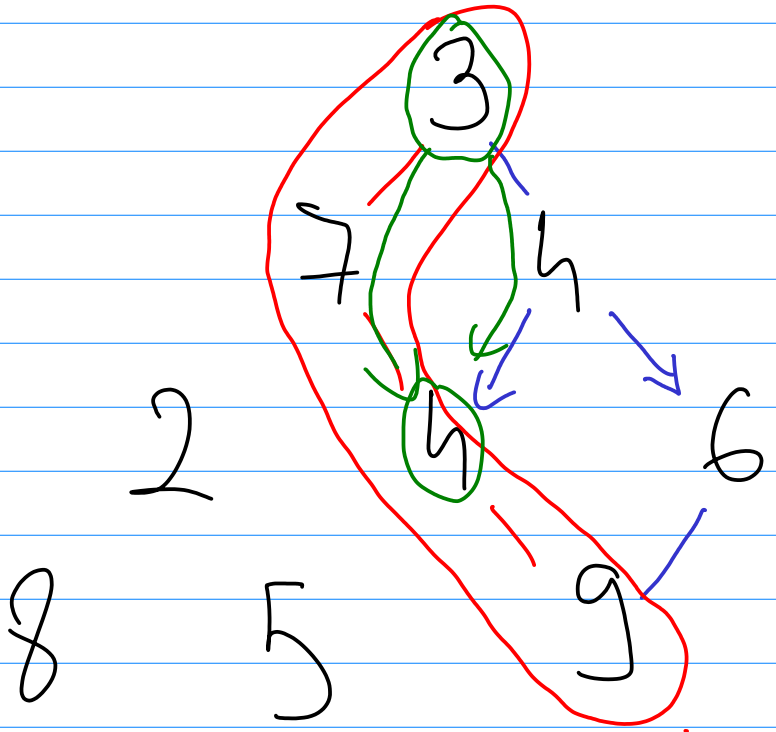
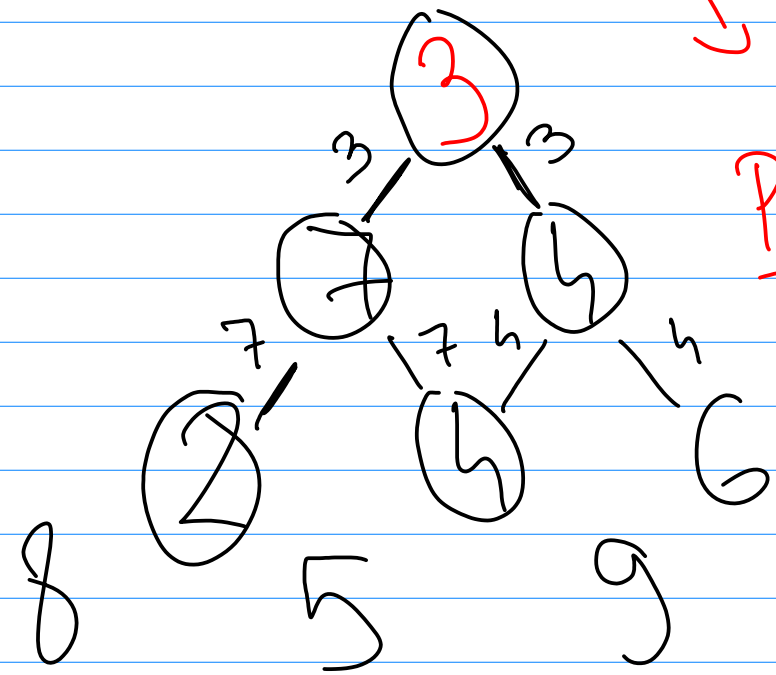
Curs 3



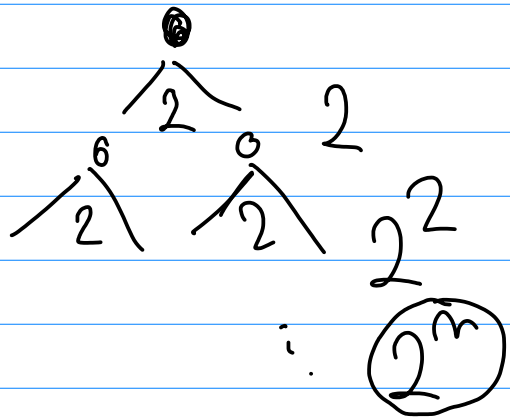
Greedy?

↳ Cost = 23



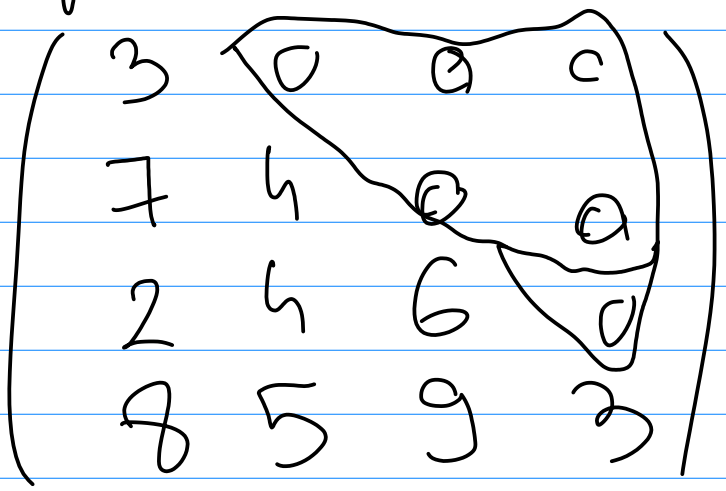
Pb maximizăm suma pe un astfel de drum

Soluția brute force:



Dijkstra: – reprezentăm matrice

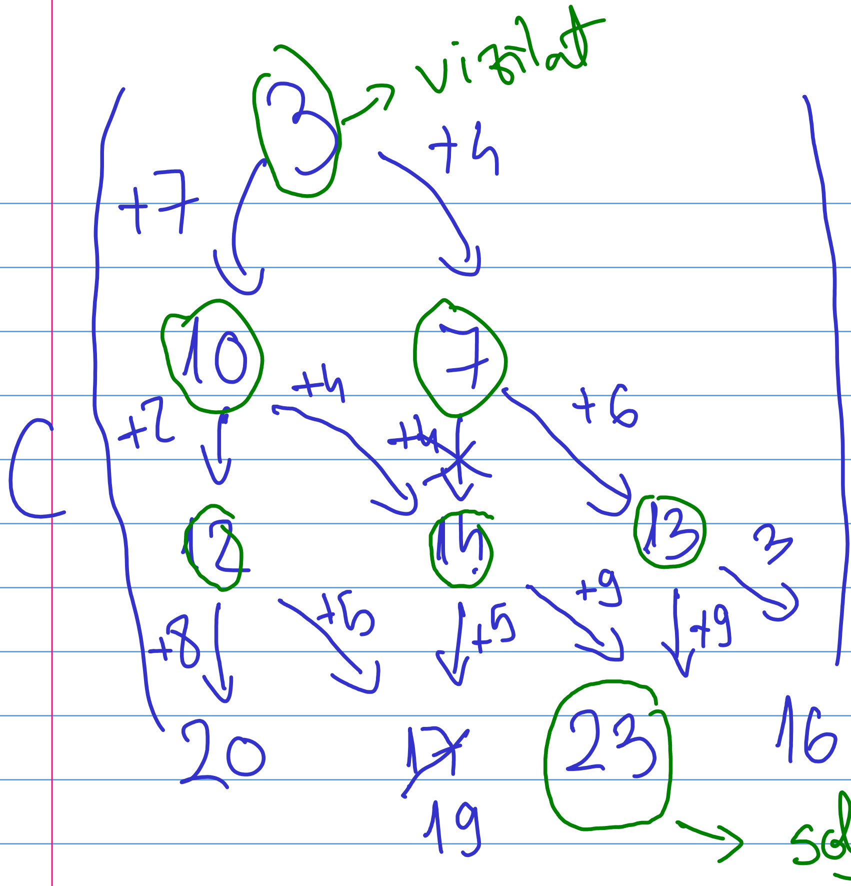
Piramida inițială:



Matrice de costuri:

$$C = \begin{pmatrix} 3 & & & \\ 0 & 0 & & \\ 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 \end{pmatrix}$$

Calculăm costul pasului stânga / dreapta
- dacă este mai mare decât elem lui C îl stocăm în matrice



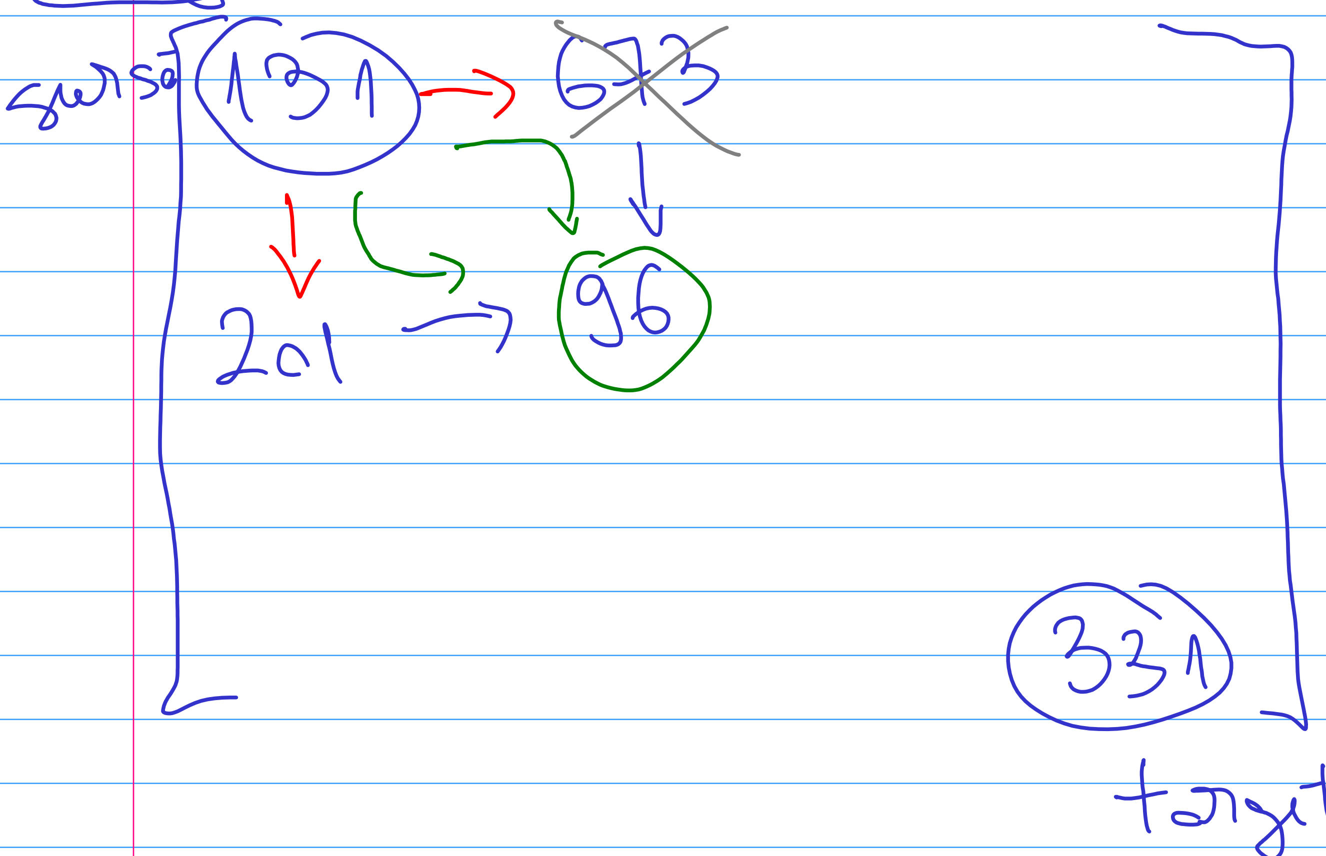
→ primo iterație

Complexitate:

$1+2+3 \ldots + n$

$= O(n^2)$

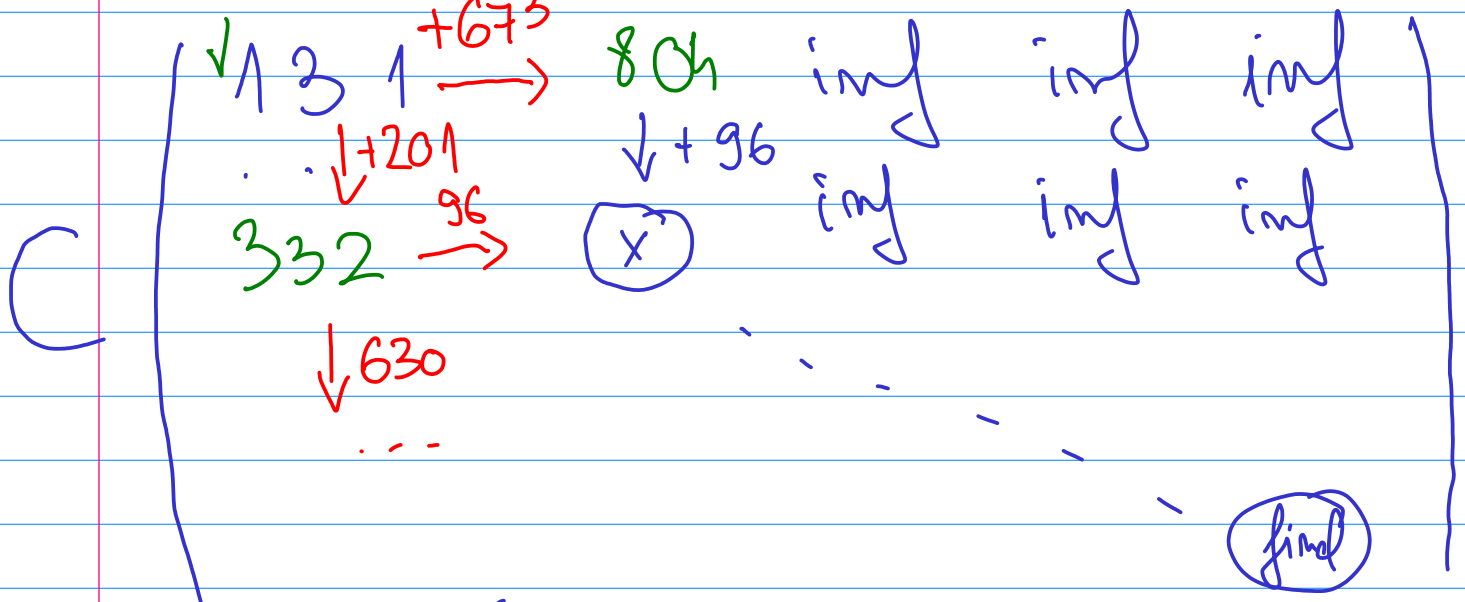
Project Euler P81



Alg. Dijkstra: (nu construim graful!)

→ Menținem într-o matrice 0-1 vârfurile vizitate

→ Matrice de "costuri"



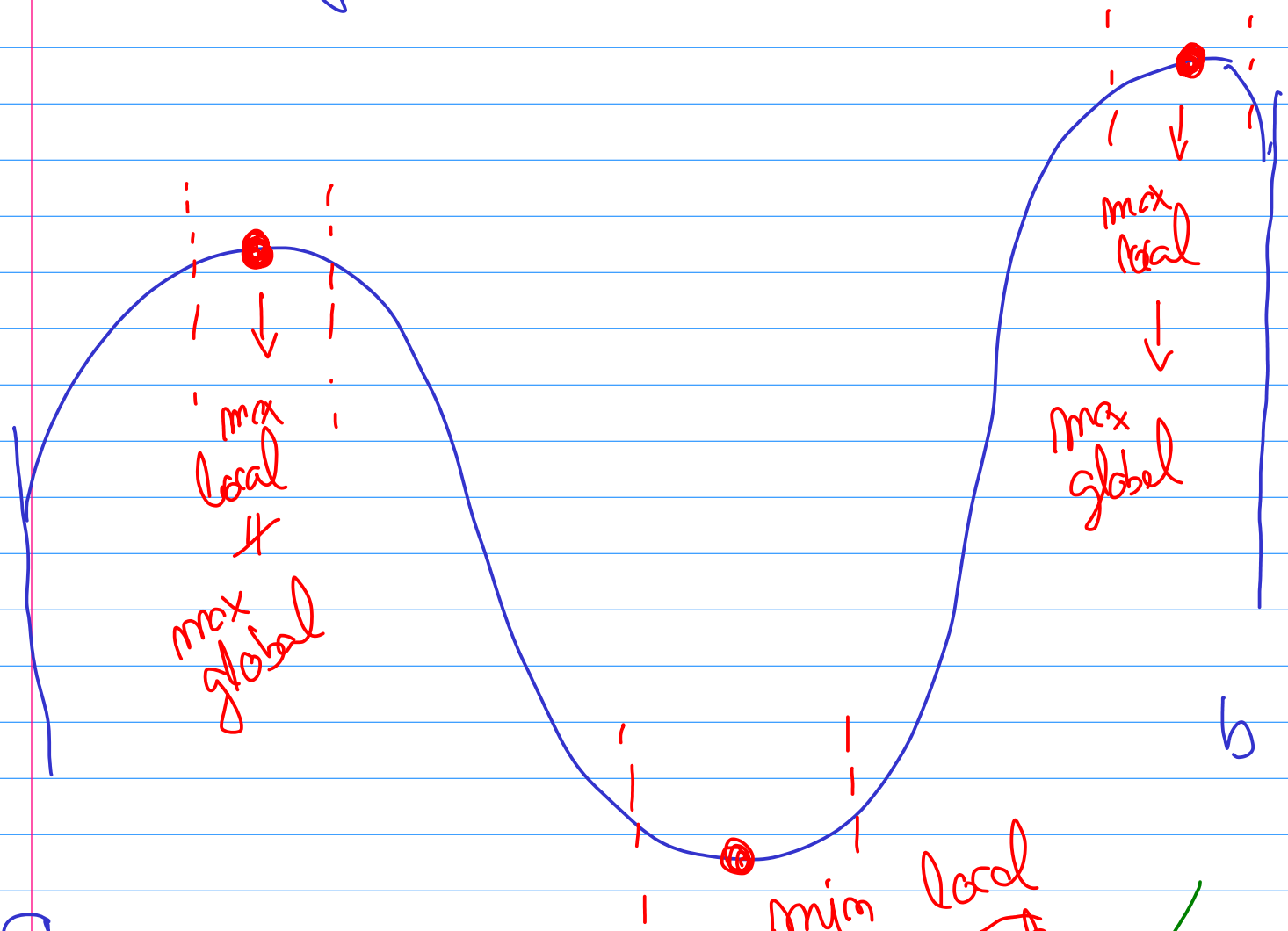
Nodul actual (1,1)

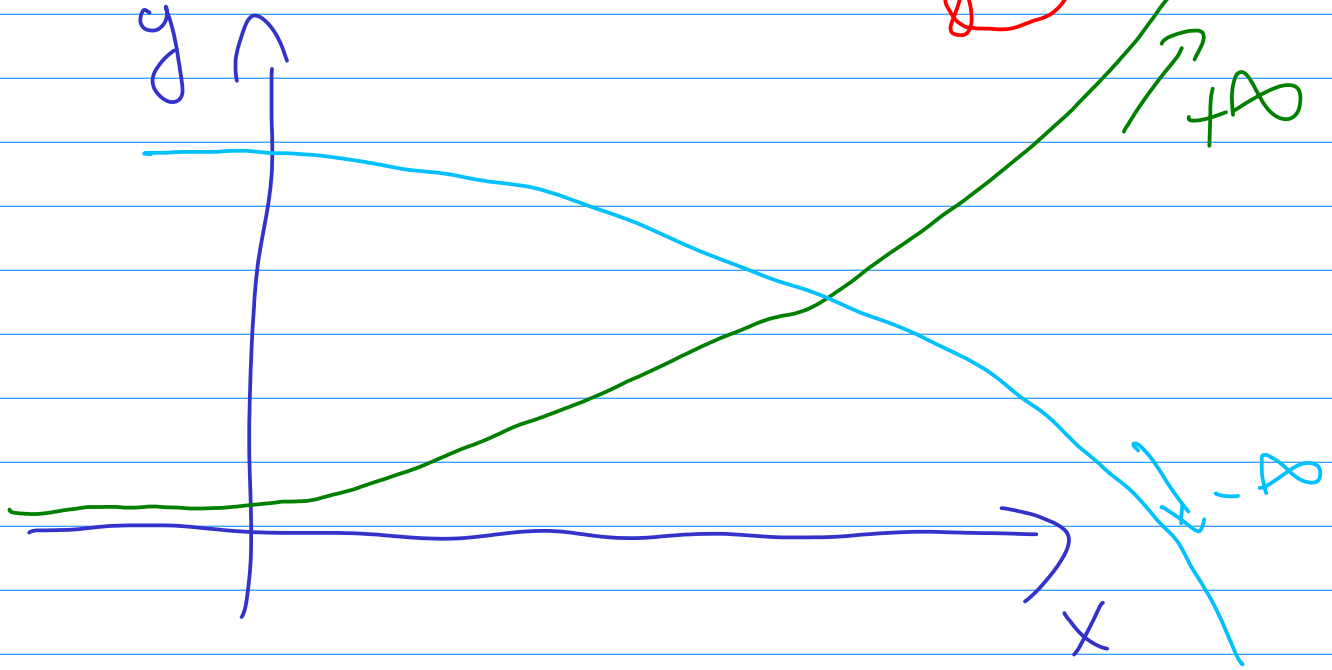
- testăm vecinii (jos + dreapta)
- dacă găsim un cost mai mic
  Schimbăm elementul din C
- adăugăm vecini nevizitați într-o listă tip "coadă"

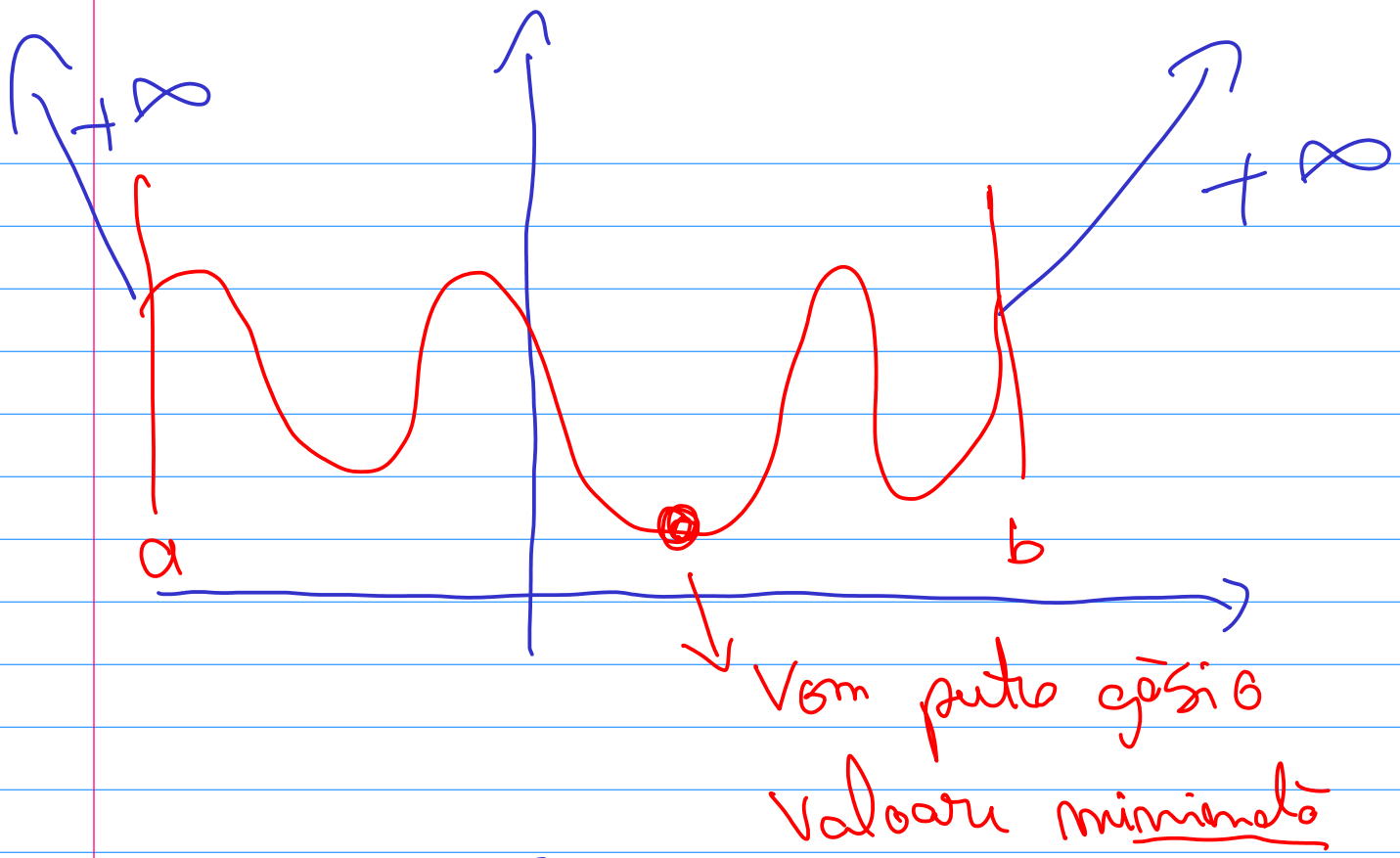
$L = \{(1,2), (2,1)\}$

→ mod uniform (1,2)

funcție $f: [a, b] \to \mathbb{R}$





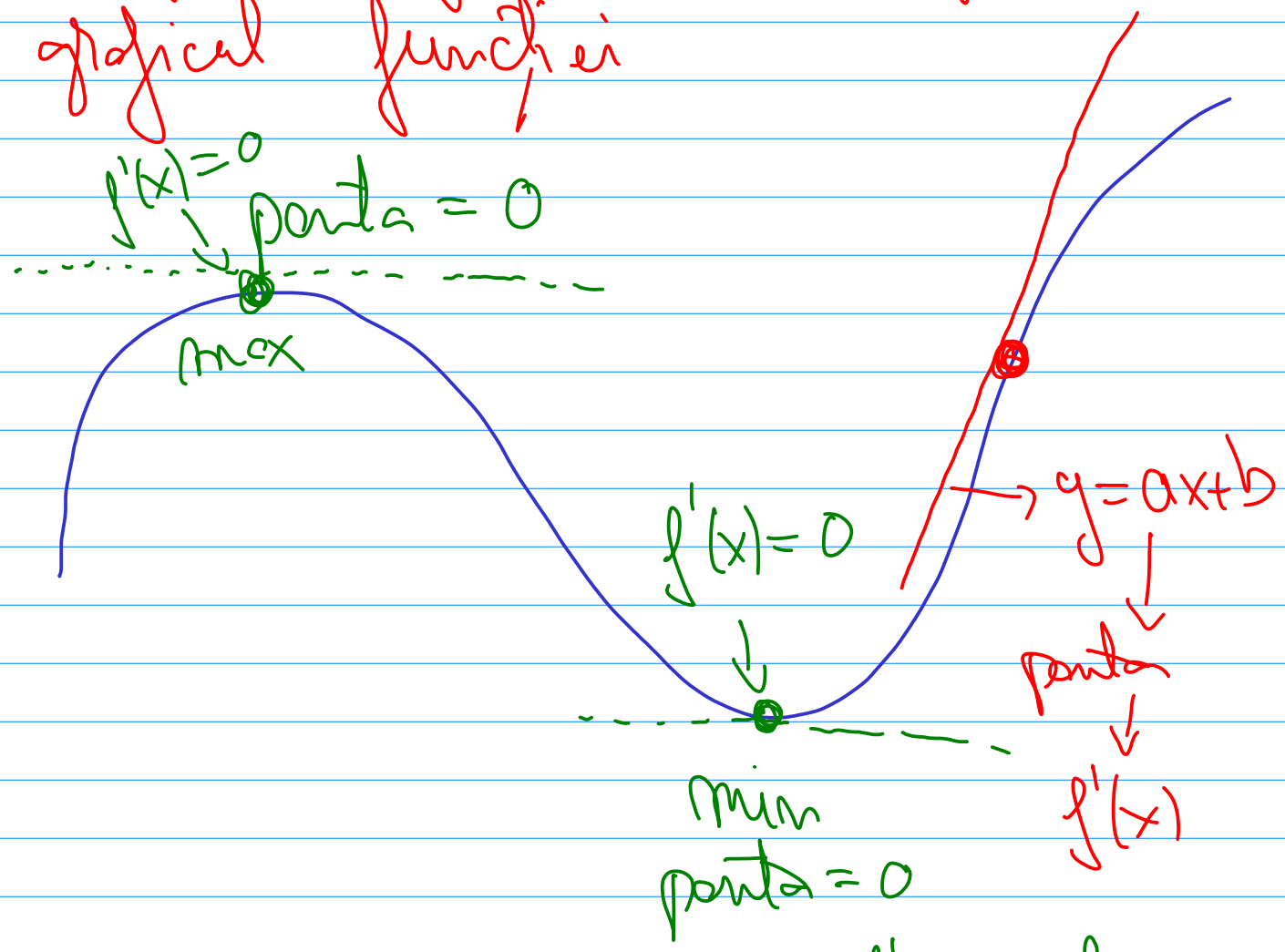


Existență ? este importantă:

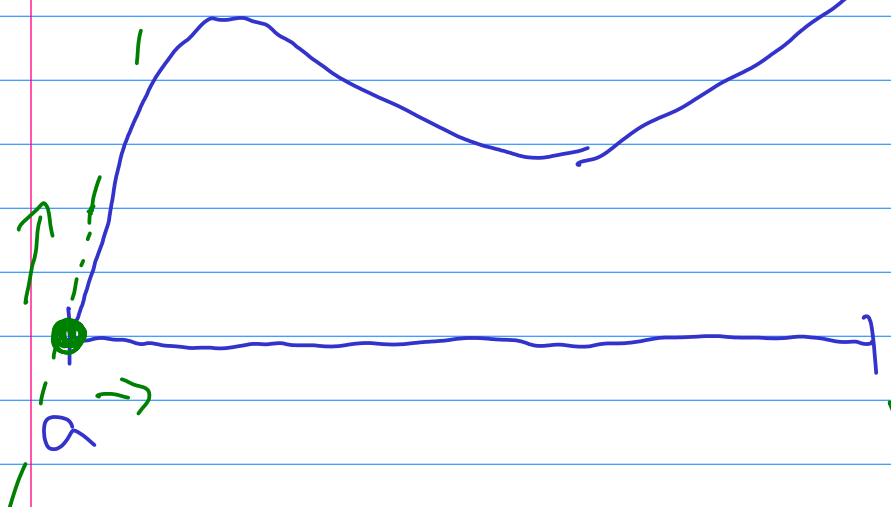
- dacă dem pt că vedem teoretic nu există valoare minimală atunci nici algoritmii numerici nu vor funcționa bine pe acest problemă.

Condiții optimalitate:

- derivata unei funcții: panta dreptei tangente în acel pct la graficul funcției



- $f' > 0 \Leftrightarrow f$ crește
- $f' < 0 \Leftrightarrow f$ descrește



- pol Taylor în jurul unui pct:

$f(x) \approx$ polinom de grad n în jurul lui x

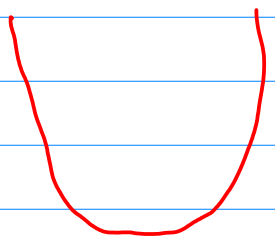
Pol grad 1: → tangentă

Cond optimalitate de ordinul 2

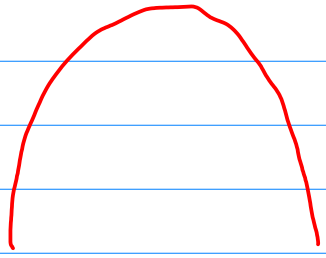
$$f(x) \approx f(a) + f'(a)(x-a) + \frac{f''(a)}{2}(x-a)^2$$

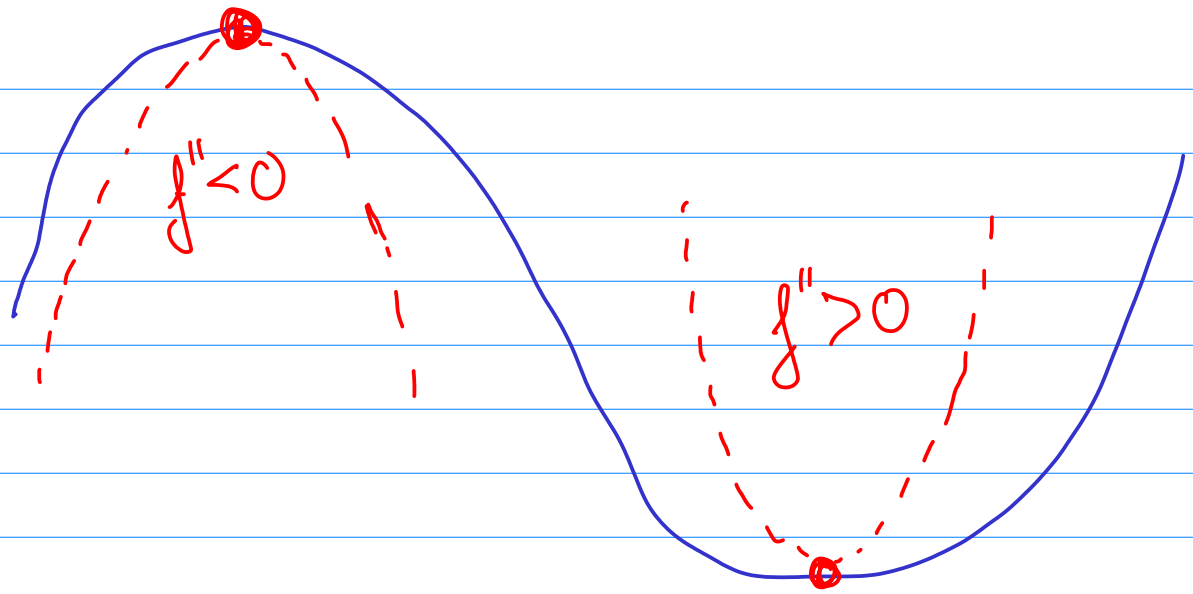
ax^2+bx+c → parabolă

$a>0$

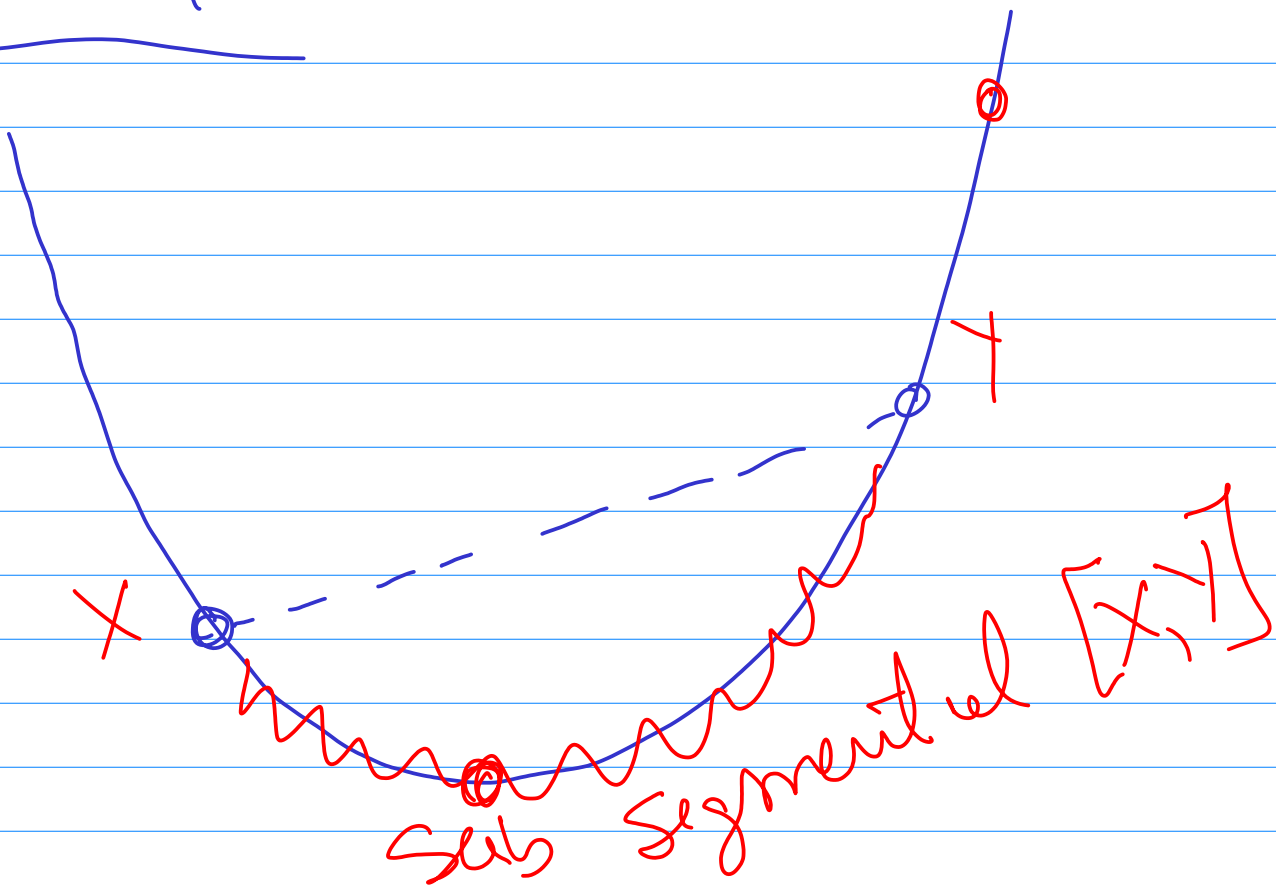


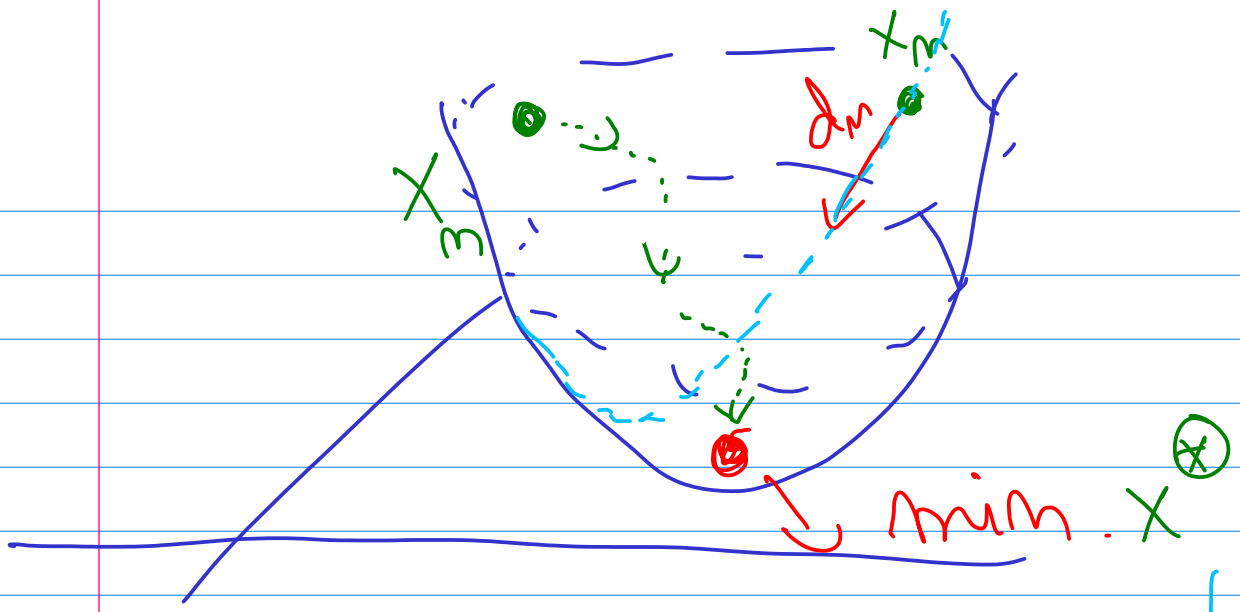
$a<0$



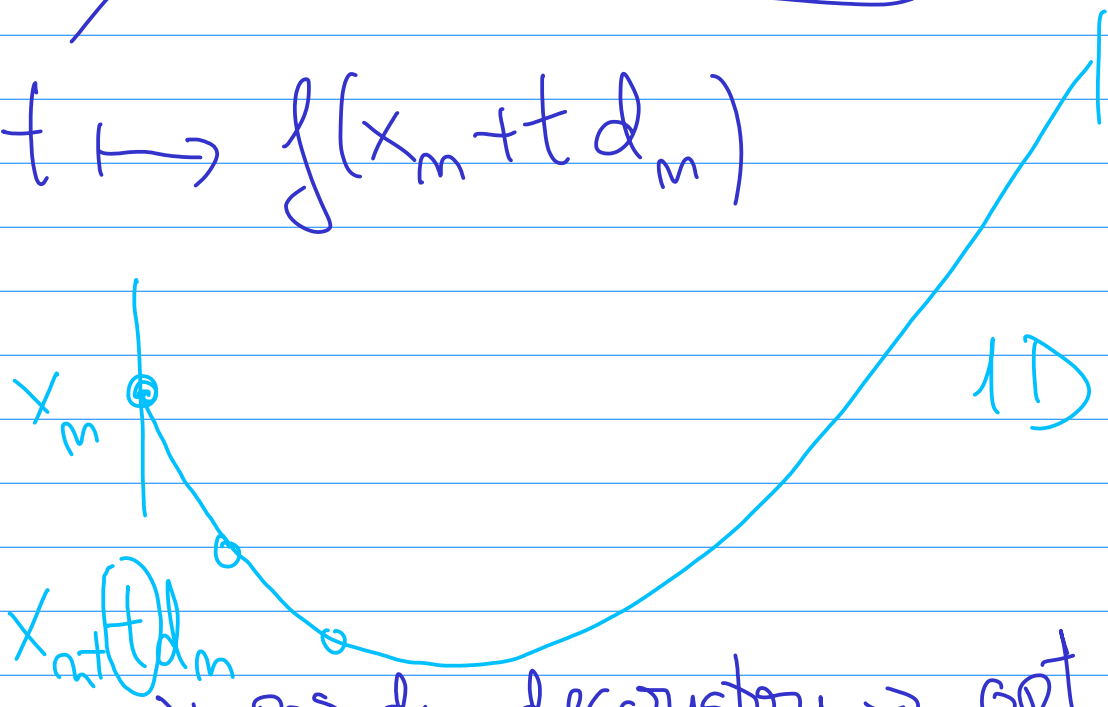


Convexity



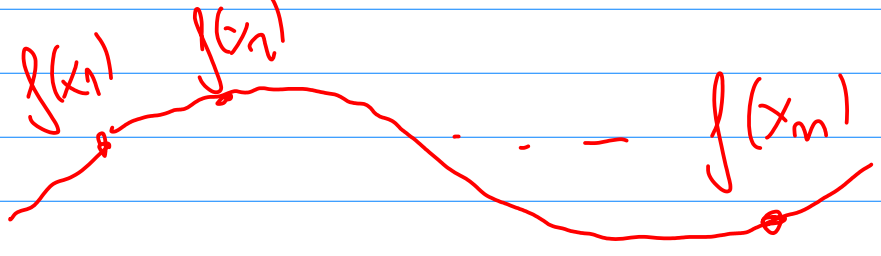


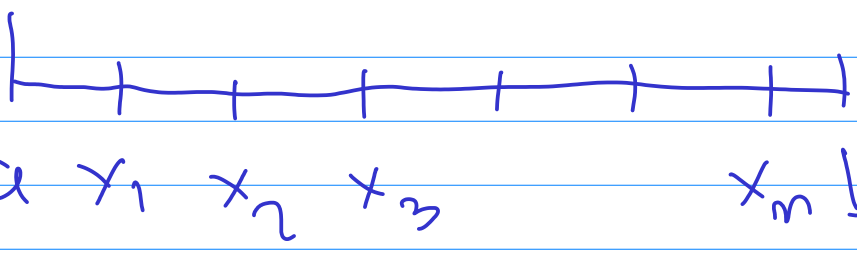
$$t \mapsto f(x_m + t d_m)$$



↘ pas de descreștere → opt în 1D

Grid search





→ selectăm cea mai mică sau mai mare valoare