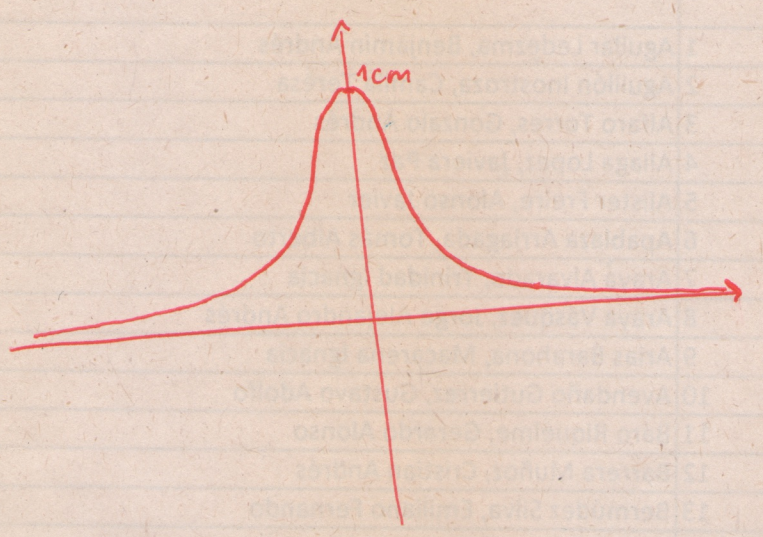
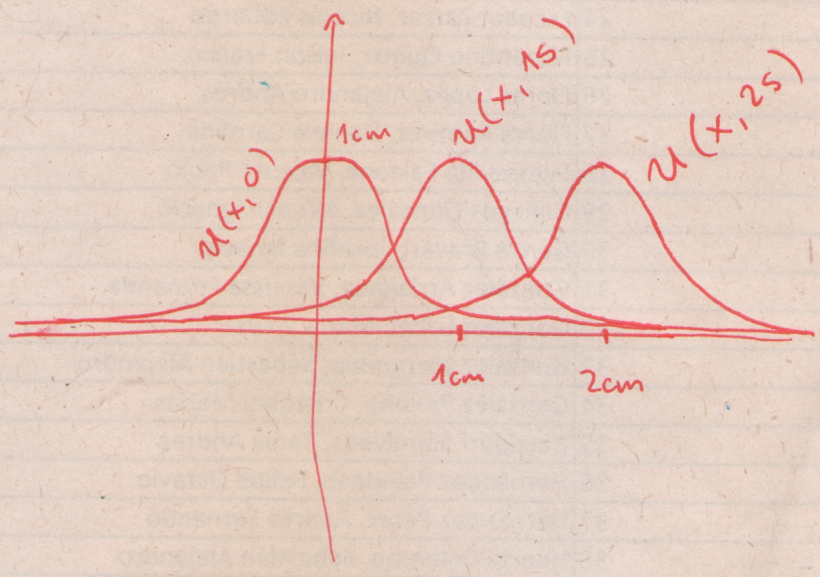
P2

a)

$$f(x) = \frac{1\,cm}{1 + \left(\frac{x}{1\,cm}\right)^2}$$



$$f(\bar{x}) = \frac{1\,cm}{1 + \left(\frac{x - ct}{1\,cm}\right)^2} = \frac{1\,cm}{1 + \left(\frac{x}{1\,cm}\right)^2 + \frac{c^2t^2}{1\,cm^2} - \frac{2xct}{1\,cm^2}} = u(x,t)$$



2 ptos

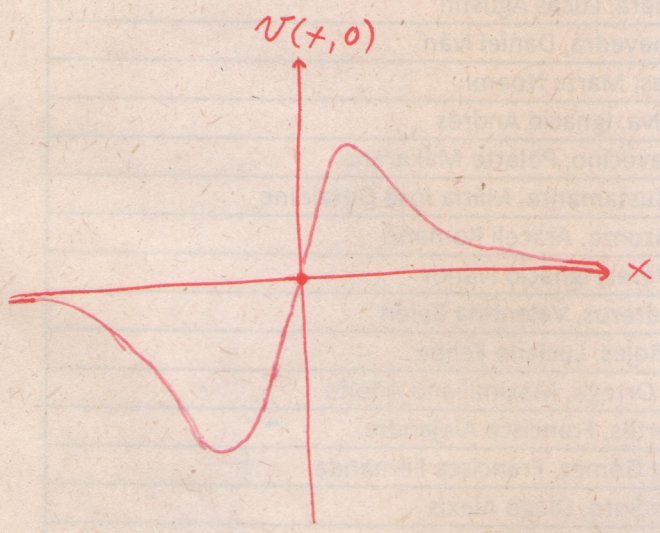
b) $$v(x,t) = \frac{\partial u}{\partial t} = \frac{-1\,cm}{\left(1+\left(\frac{x-ct}{1\,cm}\right)^2\right)^2} \cdot 2\left(\frac{x-ct}{1\,cm}\right)\cdot\left(\frac{-c}{1\,cm}\right)$$

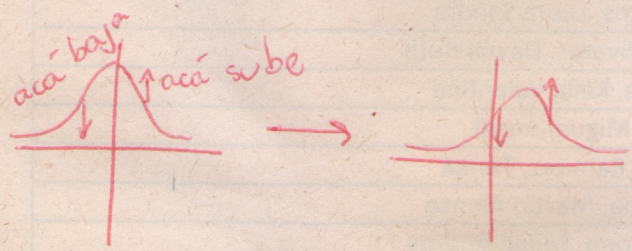
$$= \frac{\frac{2c(x-ct)}{1\,cm}}{\left(1+\left(\frac{x-ct}{1\,cm}\right)^2\right)^2}$$

$$\Rightarrow v(x,0) = \frac{2cx/1\,cm}{\left(1+\left(\frac{x}{1\,cm}\right)^2\right)^2} = \frac{2x/1s}{\left(1+\left(\frac{x}{1\,cm}\right)^2\right)^2} = \frac{2x}{(1+x^2)^2}$$

2 ptos

c)



→ 1,5 gráfico

→ 0,5 explicar