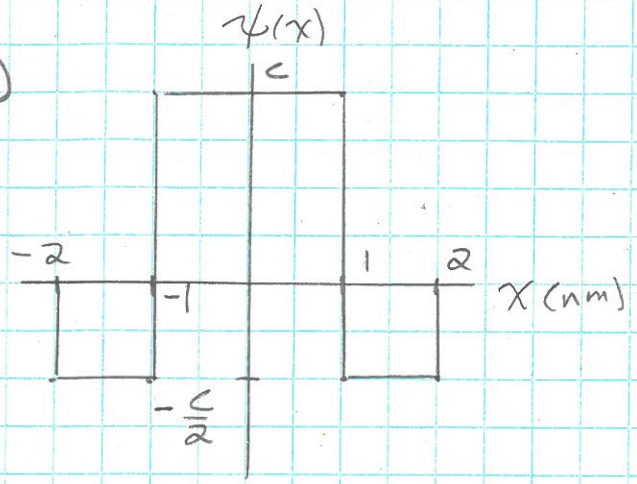
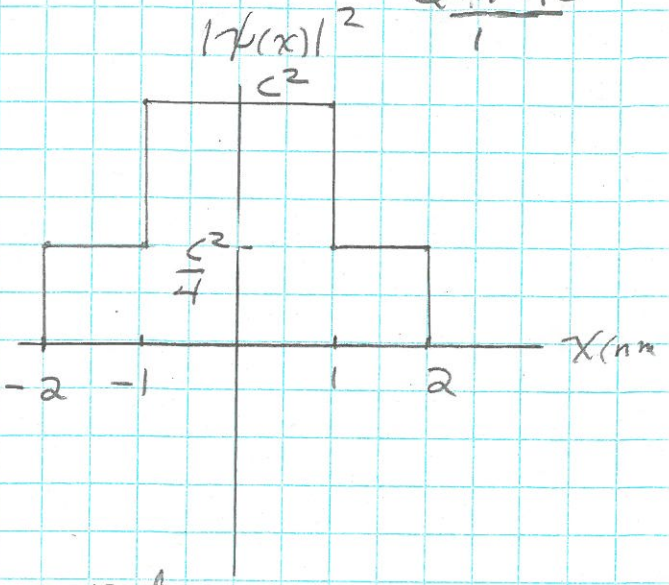
a.)



$\Rightarrow$



b.) Normalize $|\psi(x)|^2 \Rightarrow \int_{-\infty}^{\infty} |\psi(x)|^2 dx = 1$

$$\text{Area} = \frac{c^2}{4} + c^2(2) + \frac{c^2}{4} = \frac{5}{2}c^2 = 1$$

$$\therefore\ c = \sqrt{2/5}\ \text{nm}^{-1/2} = 0.632\ \text{nm}^{-1/2}$$

c.) $P(-1.0\,\text{nm} \le x \le +1.0\,\text{nm}) = \int_{-1}^{1} |\psi(x)|^2 dx$

= area under $|\psi(x)|^2$ from $x = -1 \to +1$

$= c^2(2)$

$= \frac{2}{5}(2)$

$= \frac{4}{5} = 0.80$