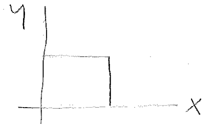
6. (8.11) lowest 6 energy levels for $a = 1.1\,b$



First, write down lowest 6 levels for $a=b$ (square box) from Fig. 8.2:

$$\begin{array}{ll|l} n_x = 1, & n_y = 1 & 2E_0 \\ 2 & 1 & \multirow{2}{*}{$\Big\}\, 5E_0$} \\ 1 & 2 & \\ 2 & 2 & 8E_0 \\ 3 & 1 & \multirow{2}{*}{$\Big\}\, 10E_0$} \\ 1 & 3 & \end{array}$$

where $E_0 = \dfrac{\hbar^2\pi^2}{2Ma^2}$

for the non-square box, $E = \dfrac{\hbar^2\pi^2}{2M}\left(\dfrac{n_x^2}{a^2} + \dfrac{n_y^2}{b^2}\right)$

write in terms of a by substituting $b = a/1.1$

then $n_x = 1, n_y = 1 \Rightarrow E = \dfrac{\hbar^2\pi^2}{2M}\left(\dfrac{1}{a^2} + \left(\dfrac{1.1}{a}\right)^2\right) = 2.21\,\dfrac{\hbar^2\pi^2}{2Ma^2} = 2.21\,E_0$

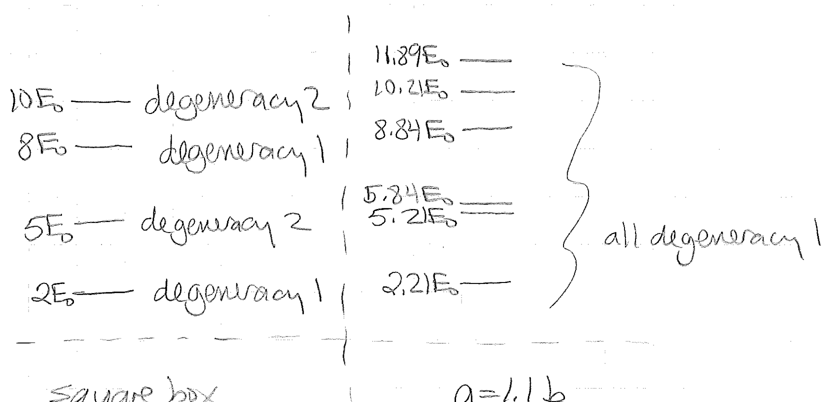
$n_x = 2, n_y = 1 \Rightarrow E = \dfrac{\hbar^2\pi^2}{2M}\left(\dfrac{2^2}{a^2} + \left(\dfrac{1.1}{a}\right)^2\right) = 5.21\,E_0$

$n_x = 1, n_y = 2 \Rightarrow E = \dfrac{\hbar^2\pi^2}{2M}\left(\dfrac{1}{a^2} + 2^2\left(\dfrac{1.1}{a}\right)^2\right) = 5.84\,E_0$

$n_x = 2, n_y = 2 \Rightarrow E = \dfrac{\hbar^2\pi^2}{2M}\left(\dfrac{2^2}{a^2} + 2^2\left(\dfrac{1.1}{a}\right)^2\right) = 8.84\,E_0$

$n_x = 3, n_y = 1 \Rightarrow E = \dfrac{\hbar^2\pi^2}{2M}\left(\dfrac{3^2}{a^2} + \left(\dfrac{1.1}{a}\right)^2\right) = 10.21\,E_0$

$n_x = 1, n_y = 3 \Rightarrow E = \dfrac{\hbar^2\pi^2}{2M}\left(\dfrac{1}{a^2} + \dfrac{3^2(1.1)^2}{a^2}\right) = 11.89\,E_0$



so no degeneracies left