**Worksheet #9**

(Monday, January 26, 2026)

**Name**

**Questions (5 pts):**

As we discussed, the Schroedinger's equation for the 1$^{st}$-order perturbation leads to the following expression:

$\langle n^{(0)}| H_0 - E_n^{(0)}|n^{(1)}\rangle = \langle n^{(0)}|E_n^{(1)}-H'|n^{(0)}\rangle$

(a) Use the properties of the unperturbed Hamiltonian ($H_0 |n^{(0)}\rangle = E_n^{(0)} |n^{(0)}\rangle$) to simplify the left-hand-side of the expression above.

(b) **If you have time:** Use your result of (a) to find the first-order energy correction $E_n^{(1)}$.