0. Griffiths [2ed] Ch. 6 #1, #2, #5, #9, #16, #36.

1. Show that in **third-order** perturbation theory,

$$E_n^3 = \sum_{l,m\neq n} \frac{V_{nl}V_{lm}V_{mn}}{\Delta_{nl}\Delta_{nm}} - V_{nn}\sum_{m\neq n}\frac{|V_{nm}|^2}{\Delta_{nm}^2},$$

where $V_{mn} \equiv \langle\psi_m^0|H'|\psi_n^0\rangle$ and $\Delta_{mn} = E_m - E_n$ [Griffiths, p. 256].