Q. M.   H. W. #6

Griffiths :   # 7.31, 7.45, 7.47, 8.4, 8.19

Saxon :

Problem 4. Apply the Rayleigh–Ritz variational method to a particle in a box of width L to find:

The ground state energy using a second-degree polynomial as trial function.

~~The ground state energy using a fourth-degree polynomial~~

Problem 20. In Chapter VI we showed that an attractive square well has at least one bound state no matter how weak the potential. Use the Rayleigh–Ritz variational method to prove that this is a general property of *any* potential which is purely attractive. Do this by using the trial function

$$\psi = e^{-\alpha x^2} \leftarrow \left(e^{-\alpha X^2} \right)$$

and showing that α can always be so chosen that $E'(\alpha)$ is negative. (Why does this constitute a proof?)