UNIVERSITY OF CALIFORNIA, SANTA BARBARA
Department of Physics

Physics 115A
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Problem Set #4

1. A particle in a box is in the state

$$\psi(x,t) = \frac{1}{\sqrt{2}}[\psi_0(x,t) + \psi_1(x,t)], \tag{1}$$

where ψ_0 is the normalized ground state, ψ_1 the normalized first excited state. Calculate $\langle E \rangle$, $\langle x \rangle$, $\langle p \rangle$. Discuss the time dependence of each of these quantities.

2. Problem 1, Chapter 4.

3. Problem 4, Chapter 4. Note that the book may have an error. Use $\langle p^2 \rangle$ given by (4-26).

4. Problem 5, Chapter 4.

5. Problem 6, Chapter 4.