

Physics 221A

Quantum Field Theory

Fall 2011

Prof: Joe Polchinski

joep@kitp.ucsb.edu

ASSIGNMENT #3

Due: Weds., Oct. 17, 5pm in graders' mailbox.

1. Srednicki 6.1.

2. An easier way to do 6.1b, if we don't need the overall normalization: Write $q(t) = q_{\text{cl}}(t) + \Delta q(t)$, where $q_{\text{cl}}(t)$ solves the classical equation of motion with boundary conditions $q_{\text{cl}}(t') = q'$, $q_{\text{cl}}(t'') = q''$. Show that the path integral separates into a q', q'' dependent factor that reproduces 6.1b,c, times a q', q'' independent path integral over $\Delta q(t)$.

Some short calculations:

3. Verify the first line of Srednicki 6.20 from the definition of $|q', t'\rangle$.

4. Srednicki 7.1

5. Srednicki 7.2