Homework 5; due Tuesday, Nov 5

1. Calculate the 1-particle irreducible 2-point function for a quantum particle with potential $U(q) = m^2q^2/2 + gq^4/4!$ modulo g^3 (in momentum space, for $\hbar = 1$). In class we did it modulo g^2.

2. Let $U(q) = m^2q^2/2 + gq^3/3$. Calculate the leading term of the 1-point function $\mathcal{G}_1(t)$ (with respect to g).

3. In problem 2, calculate the connected 2-point function modulo g^3.

4. Consider the potential $U(q) = m^2 \sinh^2(gx)/2g^2$. Find a formula for $W_0(J)$ (the tree part of $\ln(Z(J)/Z(0))$ as explicitly as you can.