

Physics 471 – Fall 2009

Homework #2, due Friday, September 18 (point values for each problem are given in square brackets)

1. [6] Griffiths problem 1.9.
Hints: For part (b), write all the derivatives of ψ as polynomials in x times ψ itself, then ψ will factor out of the Schrodinger equation.
For part (c), you can save some work if you write $\langle p^2 \rangle$ in terms of $\langle x^2 \rangle$, which you have already calculated.
2. [5] Do the four exercises from section 2 (Differential Equations) of the Math Review sheet. (The last one is worth 2 points.)
3. [3] Griffiths problem 2.2. You must draw some pictures to make your argument clear. Words alone will not suffice.
4. [6] Griffiths problem 2.4. To calculate $\langle x^2 \rangle$, use $\sin^2\theta = [1 - \cos(2\theta)]/2$, then integrate by parts, then finally use the integrals on the inside back cover of your textbook. (If you find an easier way, let me know.)

Honors Option problem: Griffiths problem 1.7.

Note: Every student in the class must be familiar with the result given in Griffiths problem 1.7. But only those students taking the Honors Option or those intending to attend graduate school in physics or astronomy are expected to do the problem. It involves integration by parts, and is very similar to the derivation of Eqn. [1.33] in the book.