

Physics 451- Fall 2012

Homework #16

Due Friday, Nov 2, by 7pm

Please place your assignment in the “Physics 451” slot across from N373 ESC.
Help sessions twice a week: T Th from 4pm to 6pm N337 ESC

List of problems (from the textbook):

4.1

4.2

4.3

4.5

Hint:

For Problem **4.3**: remember that the orthonormality for the angular functions Y_l^m means:

$$\int_{\phi=0}^{2\pi} \int_{\theta=0}^{\pi} Y_l^m(\theta, \phi) Y_{l'}^{m'}(\theta, \phi) \sin \theta d\theta d\phi = \delta_{ll'} \delta_{mm'}$$
 (double integration along θ and ϕ)

For problem **4.5**, when developing $P_l^l(x)$, combine all the derivative together and

note that $\frac{d^{2l}}{d^{2l}}(x^2 - 1)^l = \frac{d^{2l}}{d^{2l}}(x^{2l}) = (2l)!$