PHYC 521: Graduate Quantum Mechanics I

Fall 2009

Homework Assignment #7

(Due November 6)

1-Exercise 16.2.4, Shankar, 2nd edition, page 445.

2-Show that the WKB approximation yields the following energy eigenvalues for a particle of mass m in a linear potential $V(x) = k|x|$:

$$E_n = \left[\frac{3k\hbar\pi}{4(2m)^{1/2}}\left(n+\frac{1}{2}\right)\right]^{2/3}.$$

Applying the method to the potential $V(x) = \lambda x^4$, show that thet following values are obtained:

$$E_n = \left[\frac{c\lambda^{1/4}\hbar}{m^{1/2}}\left(n+\frac{1}{2}\right)\right]^{4/3},$$

where c is a constant that may be found by carrying out a dimensionless integral.

3- Exercise 16.2.5, Shankar, 2nd edition, page 449.