

Physics 2300: Problem Set #9

These problems are due at before class on Wednesday, October 31. Remember to write a concise problem statement, and to give just a word or two as to where your equations are coming from.

1. A particle of mass m moves in a potential $V(x) = A/x^4 - B/x^2$ (A and B are positive constants). Find the equilibrium position and the frequency of small oscillations about that point.
2. Morin 5.60 (Solar escape velocity)
3. Morin 5.86 (Drag force on a sphere) (see problem 5.22)
4. Morin 7.2 (Cross section)
5. Morin 7.4 (r^k potential)
6. Morin 7.15 (Closest approach)
7. Morin 7.16 (Skimming a planet)
8. Morin 7.18 (Circle to parabola) Assume you are given the original radius, call it e.g. r_0 . Also assume the “radial” thrust is in the inward direction.
9. (BONUS) Morin 5.66 (Force from a wire)