

**Reading:** We are in Chapter 13 and will be finishing section 2 soon. We'll certainly be discussing the first 9 sections.

- (1) The quantum harmonic oscillator energy levels are spaced evenly, as we found when we “discovered” the Hermite polynomials in the solution to Schrödinger’s equation. For the lowest energies, how do the bouncing ball energy levels compare to this spacing? You can find this by finding the zeros of the Airy function,  $Ai(x)$ :
  - (a) From Ash’s information find the relation between energy and the zeros or roots of the Airy function.
  - (b) Using your favorite symbolic manipulator, or mathematical table, find the first 4 zeros of the Airy function  $Ai(\zeta)$  corresponding to the lowest energy levels of a quantum bouncing ball.
  - (c) Make sketch showing how these energy levels compare to the harmonic oscillator energy levels that scale as  $n + \frac{1}{2}$ . Describe the relative spacing.
- (2) Boas pg 599 problem 3