Figure 3.6 Energy levels and wave functions for a particle in a one-dimensional box. (a) The first four energy eigenvalues; the energies E' and E'' that are not eigenvalues correspond to the top and bottom wave functions shown in part (b). (b) Illustration of how only the eigenvalues give wave functions satisfying the boundary condition $\psi(a) = 0$. (c) Eigenfunctions corresponding to the first three eigenvalues. (d) The corresponding probability densities, $\mathcal{P}_n(x) = |\psi_n(x)|^2$ for $n = 1$, 2, and 3.