

Name: _____

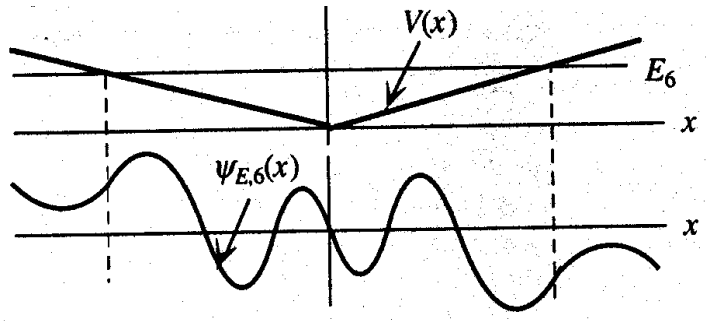
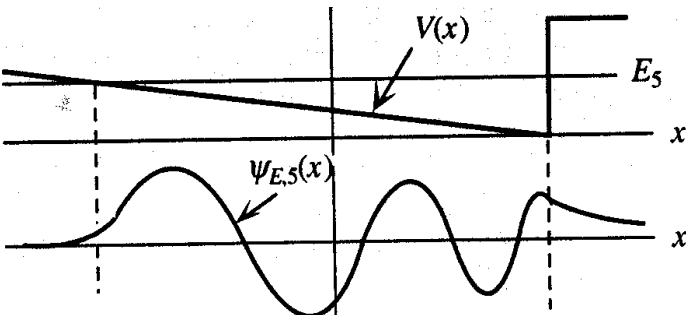
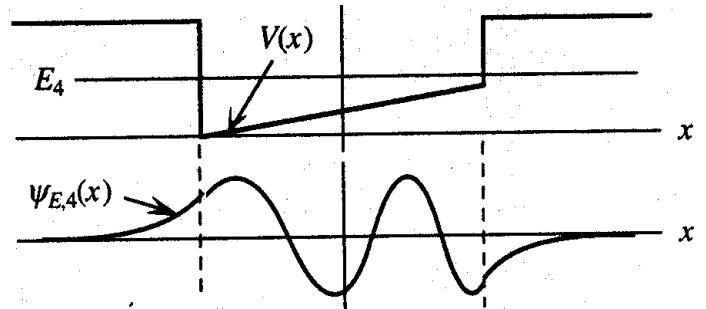
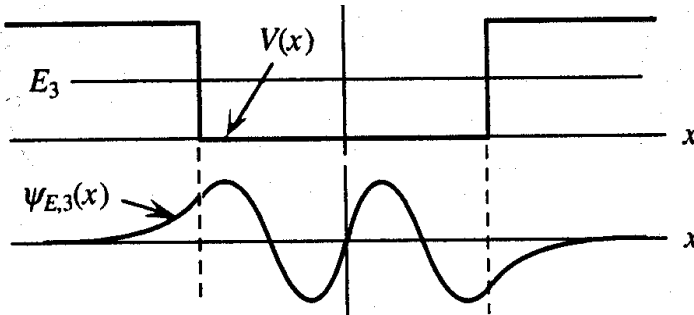
Wavefunctionology Exercises

These exercises are adapted from chapter Q11 of Tom Moore's quantum mechanics book in the "Six Ideas that Shaped Physics" series.

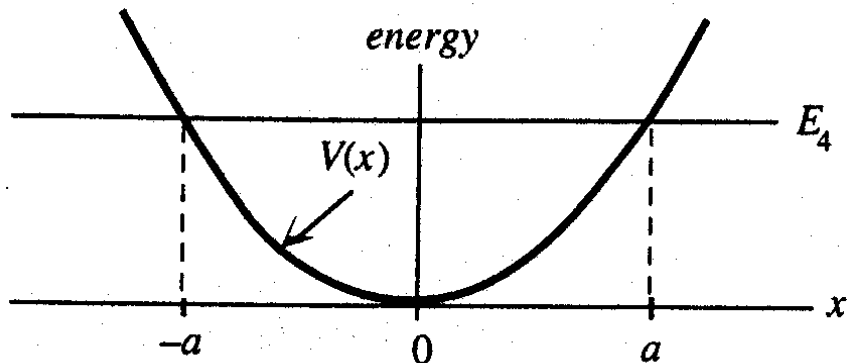
- Each of the following potential energy graphs with energy E_i marked has a wave function supposedly corresponding to the i^{th} -lowest possible energy. What (if anything) is wrong with the wave function as drawn. In some cases, multiple things may be wrong; indicate them all.

You can choose from the following possible responses. The wave function is ...

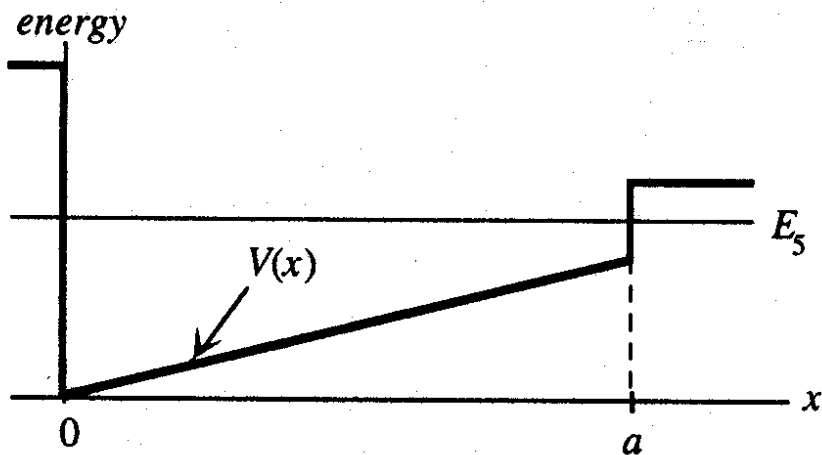
- correctly drawn (more or less).
- incorrect because it curves toward the axis in a forbidden region or it curves away from the axis in an allowed region.
- incorrect because its wavy part doesn't have the correct number of bumps (or you could count nodes instead).
- incorrect because the amplitude of its wavy part is wrong.
- incorrect because the wavelength of its wavy part is wrong.
- incorrect because one of the exponential tails is the wrong length.
- incorrect for other reasons (specify).



2. Sketch on the x -axis the energy eigenfunction (standing wave solution) corresponding to the fourth-lowest bound state energy for a particle whose potential energy is shown by the graph below.



3. Sketch on the x -axis the energy eigenfunction (standing wave solution) corresponding to the fifth-lowest bound state energy for a particle whose potential energy is shown by the graph below.



4. Sketch on the x -axis the energy eigenfunction (standing wave solution) corresponding to the fourth-lowest bound state energy for a particle whose potential energy is shown by the graph below.

