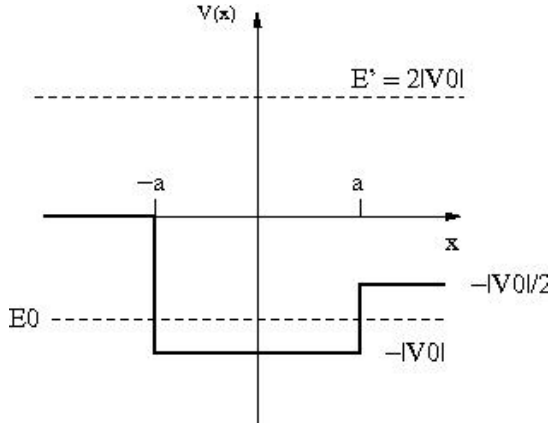
Physics 401 - Homework #11

1) **An asymmetric finite potential well.** Consider the asymmetric finite potential well shown below:



a) (three points) Suppose that there exists a ground state with energy E0 as labeled in the figure. Make a rough sketch of what you expect the ground state wavefunction to look like (no calculation is necessary), and indicate whether the function is even, odd, or neither.

b) (three points) Also sketch the 1st and 2nd excited states (no calculation is necessary)

c) (three points) How would the ground state wavefunction be altered if the potential were infinite for ($x < -a$), instead of being zero as shown in the figure? (You may either make a sketch of the new wavefunction or just describe how it changes.)

d) (three points) There also exists a free particle state with energy E' as shown in the figure. Make a sketch of the deBroglie wavelength for this state as a function of position.