Hints:

Problem 2.1b: Show that both ψ and its complex conjugate both satisfy Schrodinger's Equation. Then use the fact that linear combinations of solutions are also solutions to claim that the real solutions $\psi + \psi^*$ and $i(\psi - \psi^*)$ will satisfy also Schrodinger's Equation.

Problem 2.1c: Show that both $\psi(x)$ and $\psi(-x)$ both satisfy Schrodinger's Equation when the potential is an even function of x. Then use the fact that linear combinations of solutions are also solutions to claim that the even solution $\psi(x)+\psi(-x)$ and the odd solution $\psi(x)-\psi(-x)$ will satisfy also Schrodinger's Equation.

Problem 2.2:

1. Subtract $V_{min}\psi$ from both sides of Schrodinger's Equation.
2. Multiply both sides by ψ^* and integrate. You will need to use integration by parts on the kinetic energy term and explain why the integrated part goes to zero.
3. You should now have the equation,
   $(E - V_{min}) = \int (V - V_{min}) \psi^* \psi \, dx + \frac{\hbar^2}{2m} \int \left| \frac{d\psi}{dx} \right|^2 dx.$
4. Make an argument to explain why both integrals must be greater than or equal to zero for every normalizable solution to Schrodinger's Equation.
5. Now that you have shown that E must be greater than the minimum value of V. Draw a sketch and explain what this requires in classical physics.